Robin Generator

Model RGD351, RGD351D
RGD500, RGD500D

ISSUE EMD-GS0054

Technical Data & Overhaul Instructions

SERVICE MANUAL

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				RGD351				RGD351D				RGD500				RGD500D			
GENERATOR	Type			Revolving-Field, Self-Exciting, 2-pole, Single Phase															
	AC	Frequency		50Hz		60Hz		50Hz		60Hz		50Hz		60Hz		50Hz		60Hz	
		Output	Max. Rated	3500W 3000W		3700W 3300W		3500W 3000W		3700W 3300W		4800W 4300W		5000W 4500W		4800W 4300W		5000W 4500W	
		Voltage	Rated Current	110V	27.3A	110V	30.0A	110V / 220V	27.3A / 13.6A	110V / 220V	30.0A / 15.0A	110V	39.1A	110V	40.9A	110V / 220V	39.1A / 19.5A	110V / 220V	40.9A / 20.5A
				220V	13.6A	120V	27.5A	220V	13.6A	220V	15.0A	220V	19.5A	120V	37.5A	220V	19.5A	220V	20.5A
				230V	13.0A	—	—	120V / 240V	25.0A / 12.5A	120V / 240V	27.5A / 13.8A	230V	18.7A	—	—	120V / 240V	35.8A / 17.9A	120V / 240V	37.5A / 18.8A
				240V	12.5A	—	—					240V	17.9A	—	—				
		Power Factor		1.0															
	DC Output			12V–8.3A 100W															
	Voltage Regulator			AVR (Automatic Voltage Regulator)															
	Voltage Regulation			Within 3%															
ENGINE	Type			**Robin** Air-Cooled, 4-Cycle Diesel Engine															
	Model			DY30D								DY41D							
	Displacement			299 cc (18.27 cu. in)								412 cc (25.14 cu. in)							
	Max. Output			6.0 Ps/3000 rpm, 6.5 Ps/3600 rpm								8.0 Ps/3000 rpm, 8.5 Ps/3600 rpm							
	Fuel			Automotive type Diesel Fuel															
	Fuel Tank Capacity			16 Liters (4.2 U.S. gal.)															
	Fuel Consumption Ratio			1.2 liters/hour (2.5 U.S. pints) – (50Hz) 1.5 liters/hour (3.2 U.S. pints) – (60Hz)								1.7 liters/hour (3.6 U.S. pints) – (50Hz) 2.0 liters/hour (4.2 U.S. pints) – (60Hz)							
	Oil Capacity			1.0 liter (2.1 U.S. pints)								1.1 liter (2.3 U.S. pints)							
	Revolution			50Hz – 3000 rpm, 60Hz 3600 rpm															
	Starting System			Hand Crank (Electric Starter Optional)															
Dimensions		Length		661 mm (26.0 in)				747 mm (29.4 in)				661 mm (26.0 in)				747 mm (29.4 in)			
		Width		486 mm (19.1 in), Generator with Electric Starter:				486 mm (19.1 in)				486 mm (19.1 in), Generator with Electric Starter:				486 mm (19.1 in)			
		Height		556 mm (21.9 in)				556 mm (21.9 in)				670 mm (26.4 in)				670 mm (26. 4 in)			
Dry Weight				87 kg (192 lbs), Generator with Electric Starter: 95 kg (210 lbs)								122 kg (269 lbs), Generator with Electric Starter: 130 kg (287 lbs)							

1. Specifications are subject to change without notice.
2. Optional electric starter does not include battery. Use 12V-35AH or larger capacity battery.
3. Casters are optional for Models RGD351 and RGD351D. Models RGD500 and RGD500D have furnished with casters as standard parts.

2. PERFORMANCE

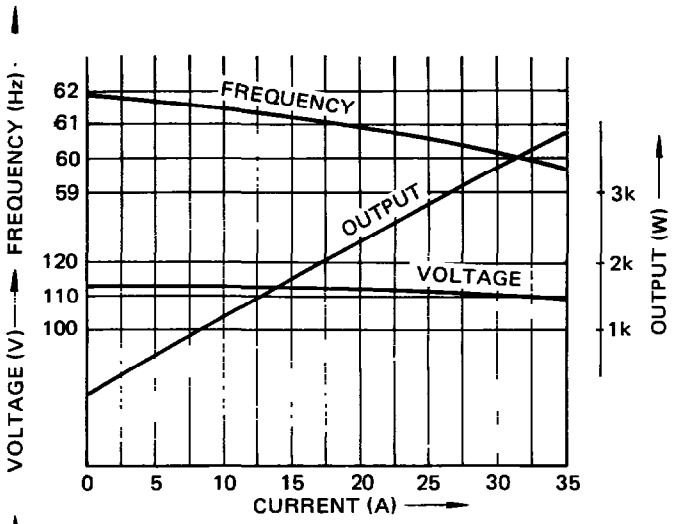
2-1 AC OUTPUT

MODEL RGD351

Type . . . . . Self Exciting, 2-Pole, Single Phase

Power Factor 1.0

Engine DY30D

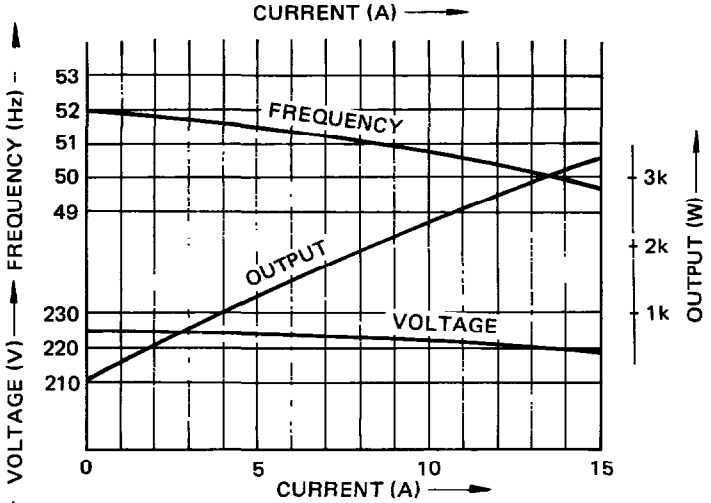


Output Max. 3700W

Rated 3300W

Frequency 60Hz

Voltage 110V

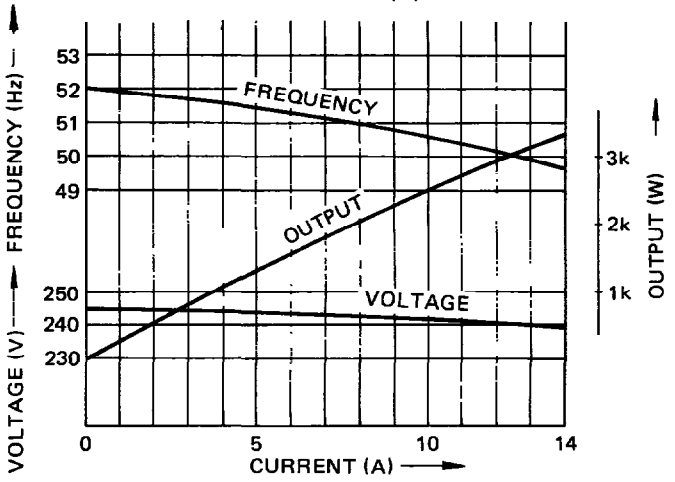


Output Max. 3500W

Rated 3000W

Frequency 50Hz

Voltage 220V



Output Max. 3500W

Rated 3000W

Frequency 50Hz

Voltage 240V

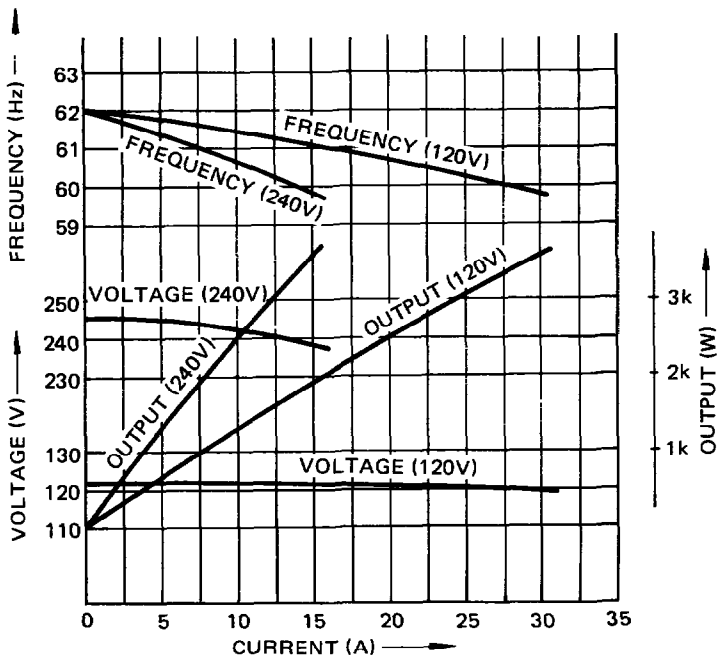
NOTE: These characteristics are typical. Those of 60 Hz 120V and 50Hz 110V or 230V are similar to the above.

MODEL RGD351D

Type . . . . . Self Exciting, 2-Pole, Single Phase

Power Factor 1.0

Engine DY30D

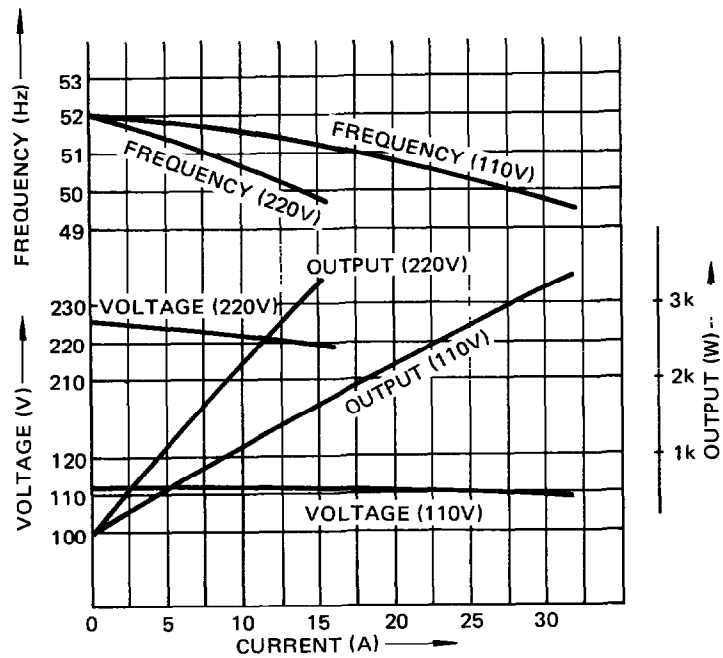


Output Max. 3700W

Rated 3300W

Frequency 60Hz

Voltage 120V/240V



Output Max. 3500W

Rated 3000W

Frequency 50Hz

Voltage 110V/220V

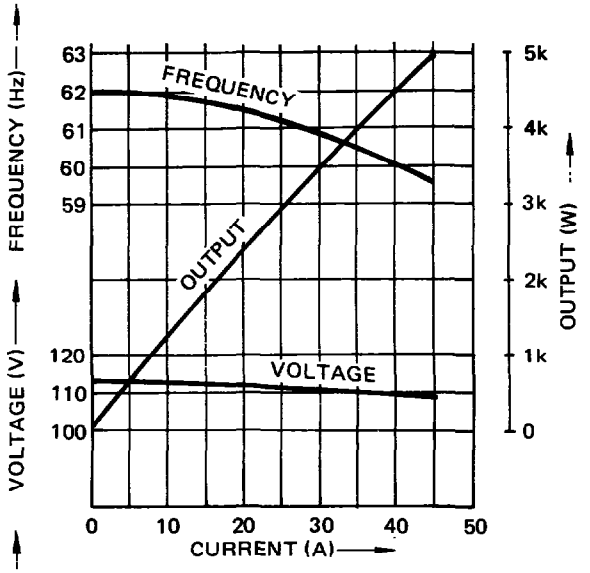
NOTE: These characteristics are typical. Those of 60Hz 110/220V and 50Hz 120/240V are similar to the above.

MODEL RGD500

Type . . . . . Self Exciting, 2-Pole, Single Phase

Power Factor 1.0

Engine DY41D

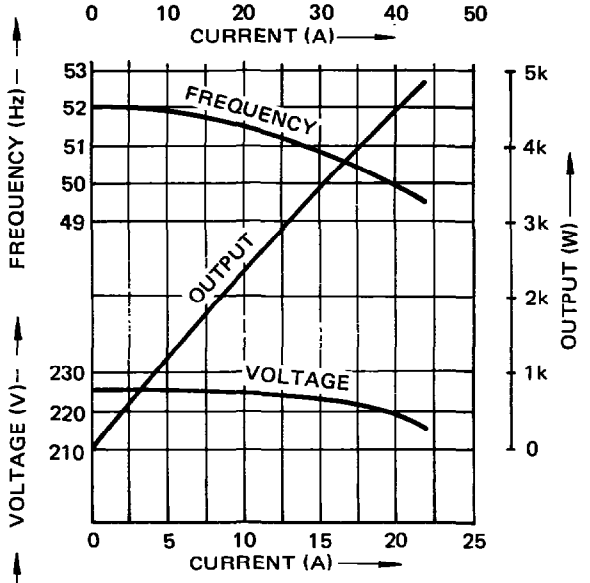


Output Max. 5000W

Rated 4500W

Frequency 60Hz

Voltage 110V

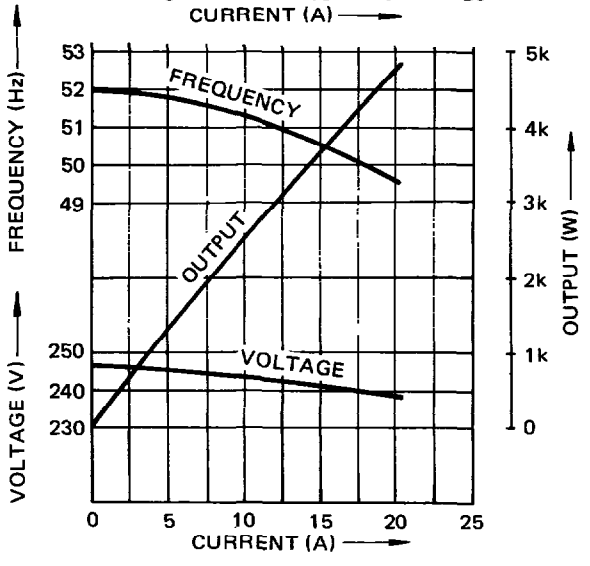


Output Max. 4800W

Rated 4300W

Frequency 50Hz

Voltage 220V



Output Max. 4800W

Rated 4300W

Frequency 50Hz

Voltage 240V

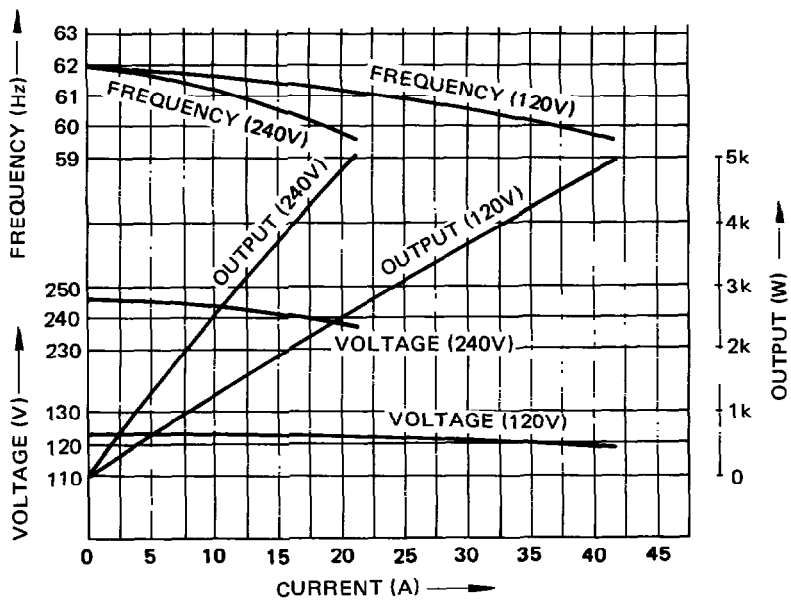
NOTE: These characteristics are typical. Those of 60 Hz 120V and 50Hz 110V or 230V are similar to the above.

MODEL RGD500D

Type . . . . . Self Exciting, 2-Pole, Single Phase

Power Factor 1.0

Engine DY41D

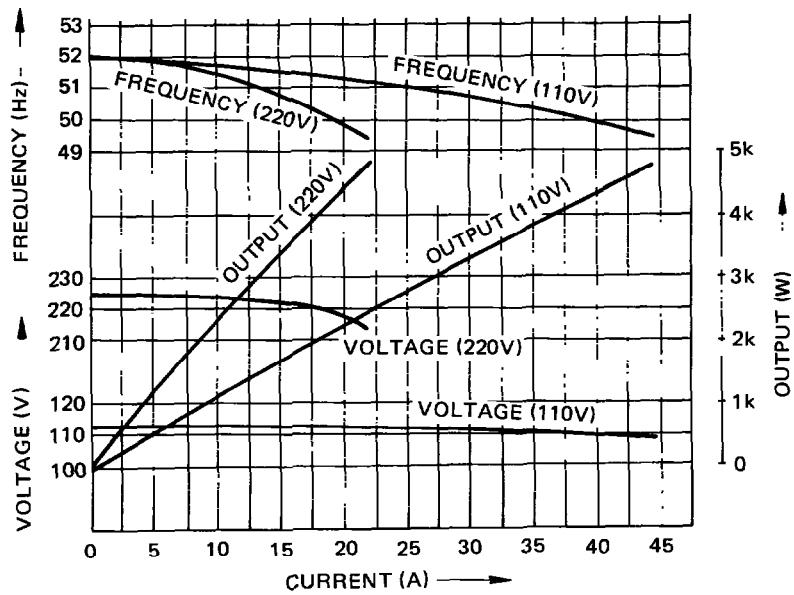


Output Max. 5000W

Rated 4500W

Frequency 60Hz

Voltage 120V/240V



Output Max. 4800W

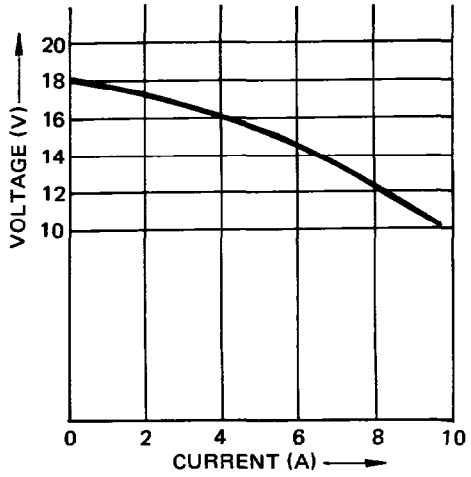
Rated 4300W

Frequency 50Hz

Voltage 110V/220V

NOTE: These characteristics are typical. Those of 60Hz 110/220V and 50Hz 120/240V are similar to the above.

2-2 DC OUTPUT



DC Voltage 12V
DC Ampere 8.3A
DC Output 100W

While charging a battery, the voltage sometimes shows about 20% higher than the characteristic measured by the resistance load because of the battery capacity, value of charging electric current, etc. The above characteristic shows battery charging value, and in case of resistance load, it shows 20% lower than this characteristic.

NOTE: It is possible to take out both AC and DC output simultaneously up to the rated output in total.

3. FEATURES

1. **Compact and Lightweight**

   Robin air-cooled diesel engine and revolving field generator designs provide added output per weight and economical operation.

2. **Good Fuel Economy**

   Direct injection combustion provides marvelous fuel saving.

3. **Long Life and Safe Operation**

   Compact and smooth running diesel engine lasts much longer than same size gasoline engine. Volatility of diesel fuel is far lower than that of gasoline, which makes it safer to handle, store and use.

4. **Centralized Control**

   A large-sized control box is employed, and the switches, voltmeter, and receptacles are located together on the front panel for easy operation.

5. **Large 16-Liter Fuel Tank**

   *16 liter (4.2 gal) capacity fuel tank is provided for 13 hours of operation for Model RGD351 or 9 hours for Model RGD500. (at the 50Hz rated output)

   *Fuel gauge is located on the tank cap for easy monitoring of the fuel level.

6. **Simple and Easy Operation**

   Easy engine starting by automatic decompressor. Controls and switches are within easy reach from the front operator's position.

7. **Quiet Operation**

   Quiet operation with Robin's newly designed air-cooled diesel engine. Low noise and less vibration for quiet and smooth operation.

8. **Small Voltage Fluctuations by AVR (Automatic Voltage Regulator)**

   The automatic voltage regulator automatically adjusts the exciting current to hold voltage regulation within 3%. This helps prolong product life without damaging the electric devices.

9. **DC Output for Battery Charging**

   The generator can generate a DC output (12V, 100W) while generating AC output so that batteries can be charged during AC operation. In this case, make sure that the total of AC and DC outputs does not exceed the rated output.

10. **Full Power Switch Provided**

    The dual voltage type has a full power switch as a standard component. The rated output can be generated at both 120V (110V) and 240V (220V).

11. **Small-Sized, Efficient Generator**

    The engine and generator are cooled by a single fan. This design makes the generator small in size and highly efficient with less space requirement and mechanical loss, and constant delivery of output power for long hours.

12. **Resistant to Inductive Load**

Exciting power is obtained from the sub coil which is wound apart from the main coil. This means less output voltage fluctuations against load variation, and thus a steady level of power. This feature is particularly effective in starting induction motors which are subject to sharp current variation.

13. **Output Voltage Waveform Close to Sine Curve**

The output voltage waveform is close to a sine curve and is free of surges so that the electrical device connected to the generator will not be damaged.

14. **100% Copper Windings**

The windings are made only of copper having low internal resistance. This feature also helps improve generator efficiency and prolong generator life.

15. **Full Frame Protection**

The fuel tank, engine and generator are fully protected by the frame. The box type frame is very convenient in stacking one generator upon another.

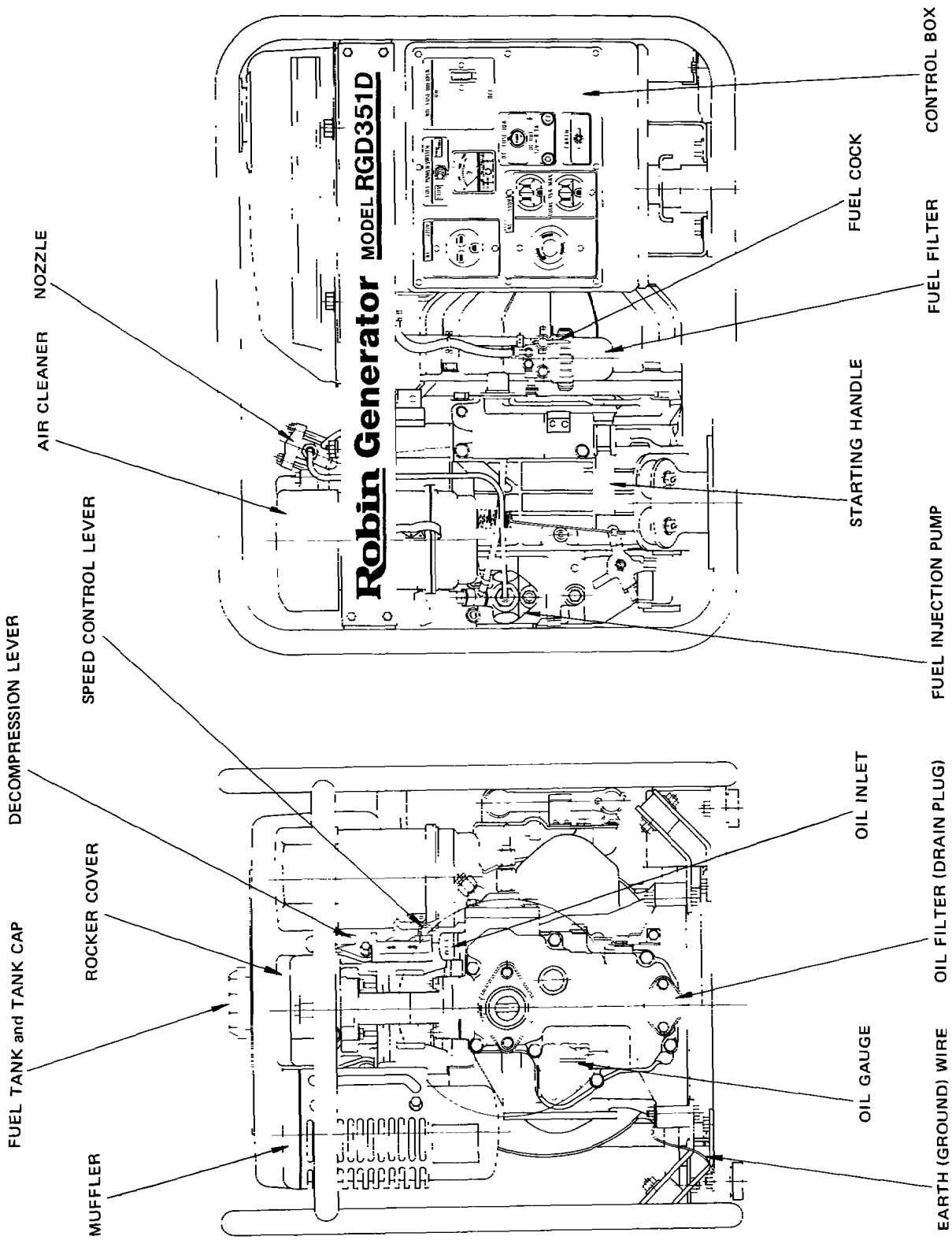
16. **Wide Range of Options**

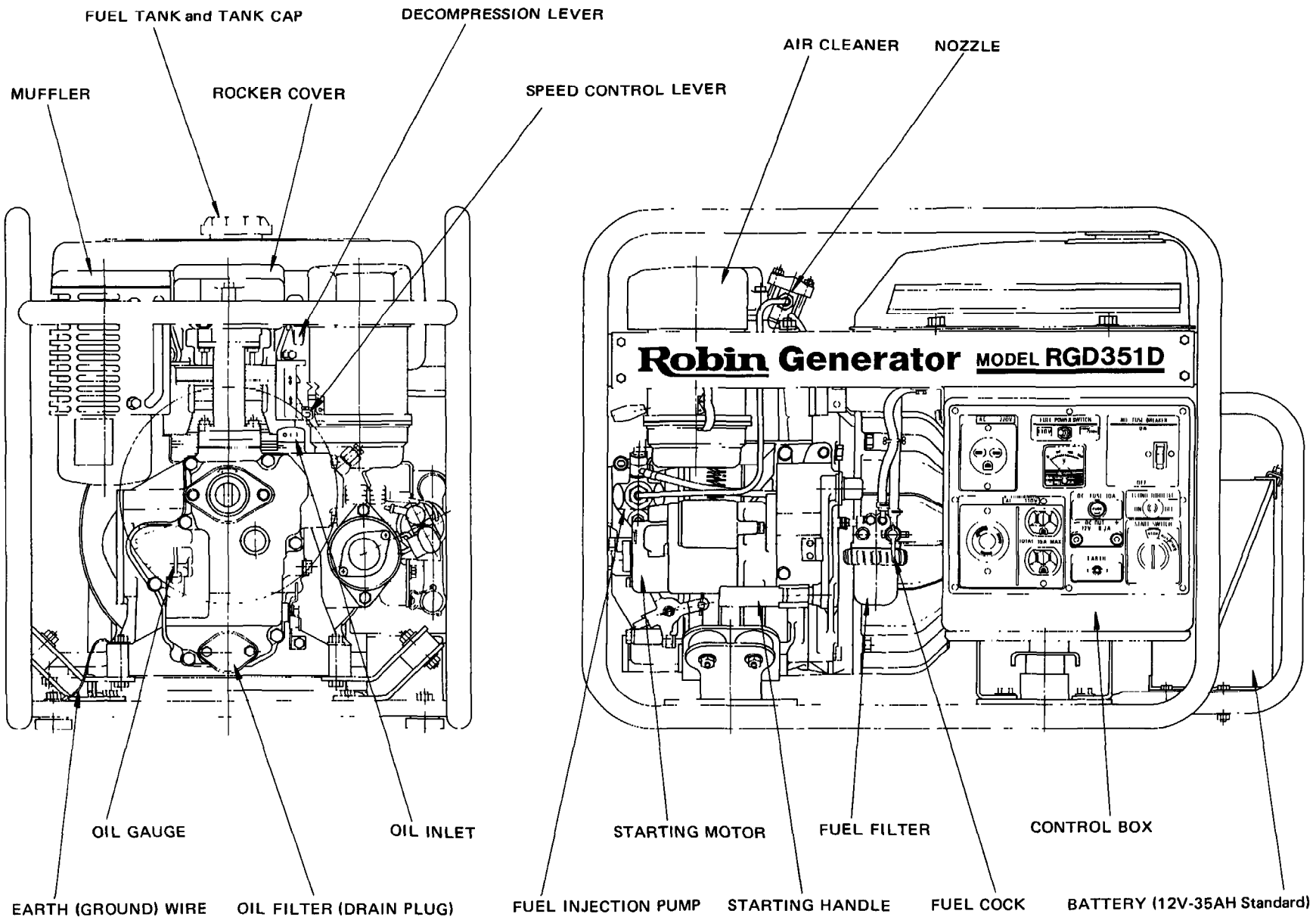
A wide range of options, including an electric starter, castors (only for RGD351), etc. are available.

4. GENERAL DESCRIPTION of GENERATOR

4-1 EXTERNAL VIEW of GENERATOR

4-1-1 HAND STARTER TYPE (Illustrated with RGD351D)

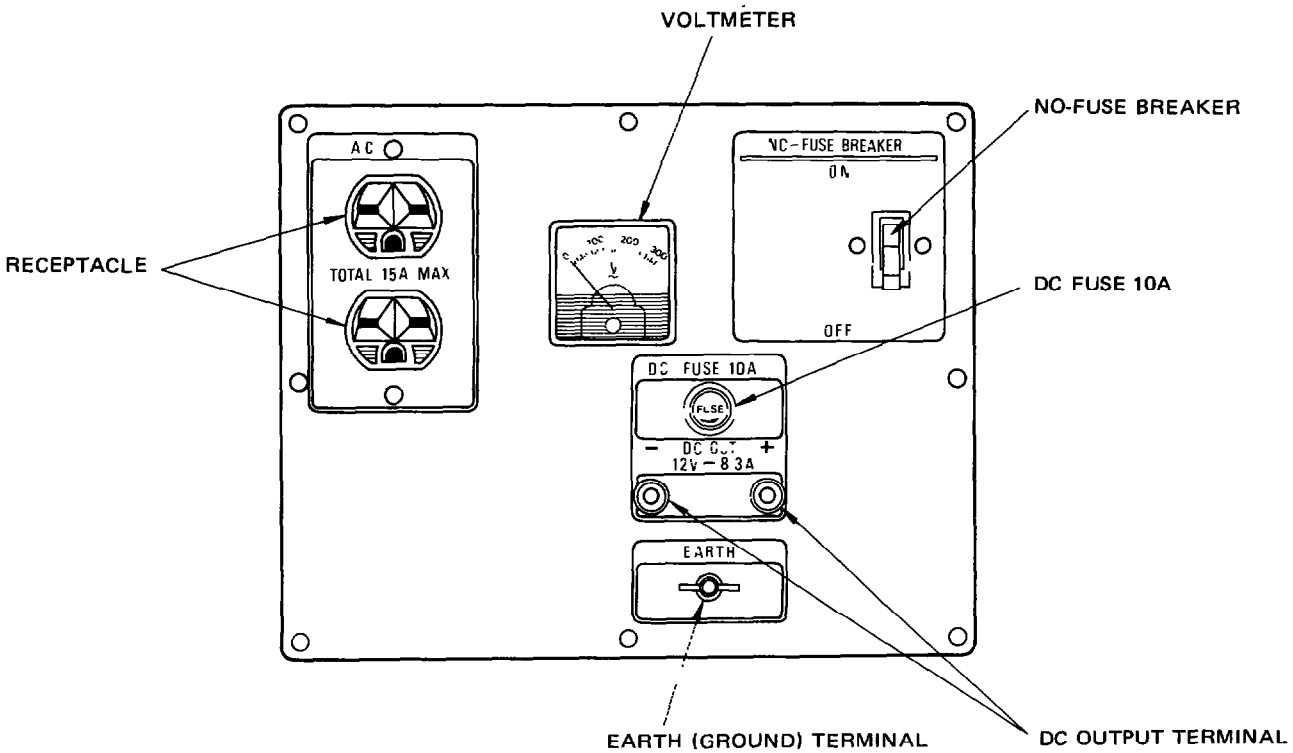



FUEL TANK and TANK CAP
DECOMPRESSION LEVER
AIR CLEANER
NOZZLE
MUFFLER
ROCKER COVER
SPEED CONTROL LEVER
Robin Generator MODEL RGD351D
OIL GAUGE
OIL INLET
STARTING MOTOR
FUEL FILTER
CONTROL BOX
EARTH (GROUND) WIRE
OIL FILTER (DRAIN PLUG)
FUEL INJECTION PUMP
STARTING HANDLE
FUEL COCK
BATTERY (12V-35AH Standard)

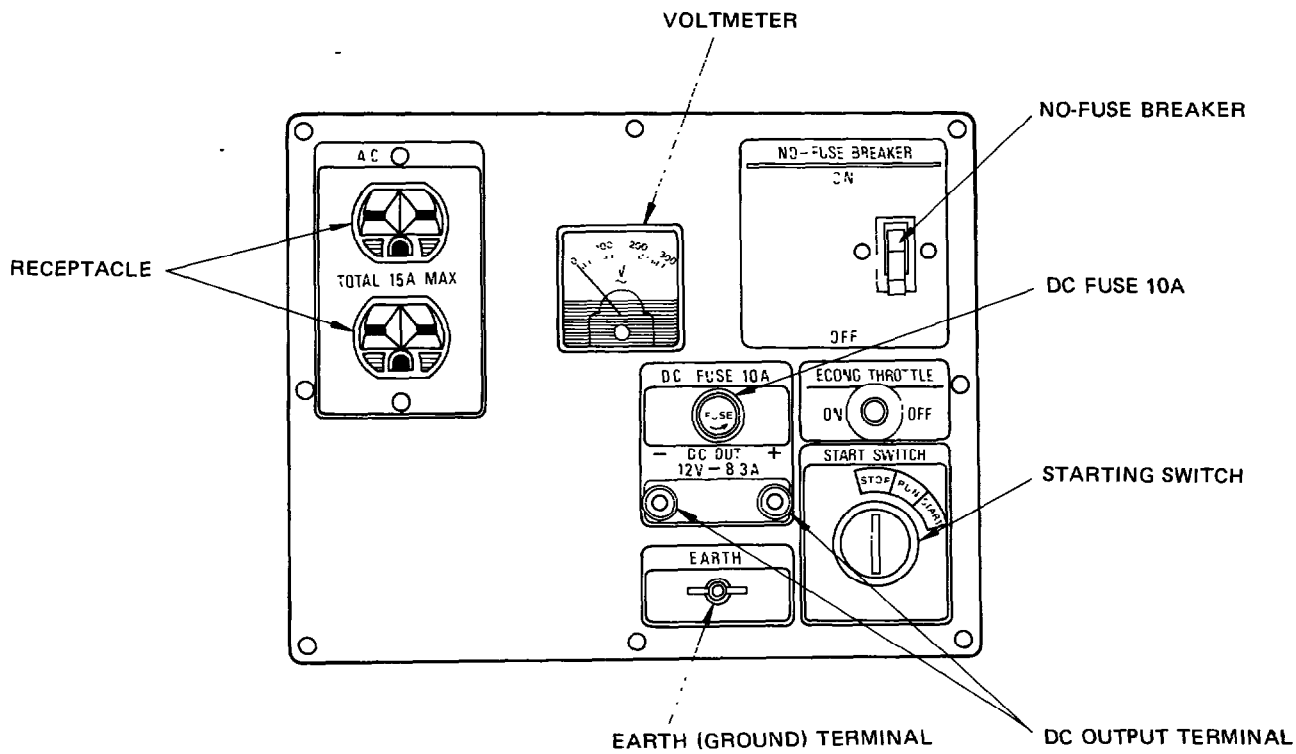
4-2 FRONT PANEL

4-2-1 RGD351

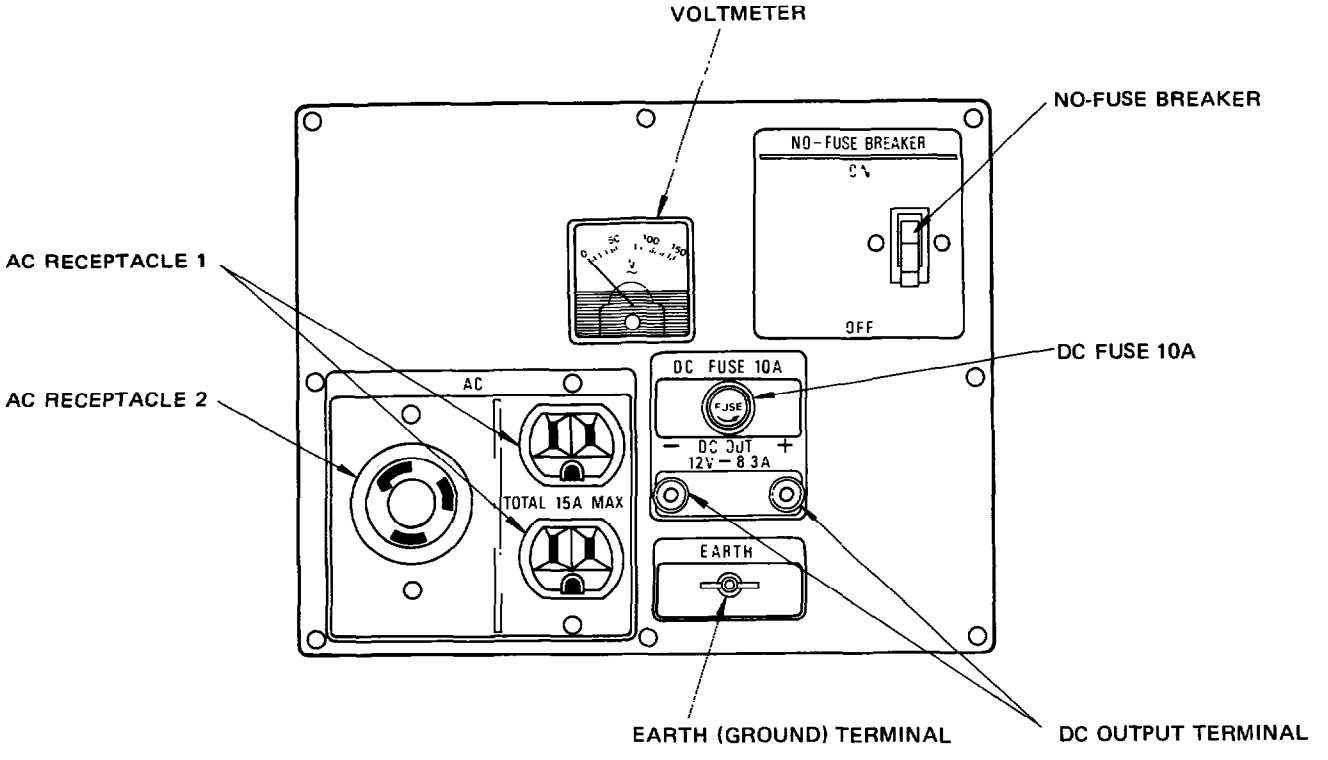
1) HAND STARTER TYPE–220V, 230V, 240V



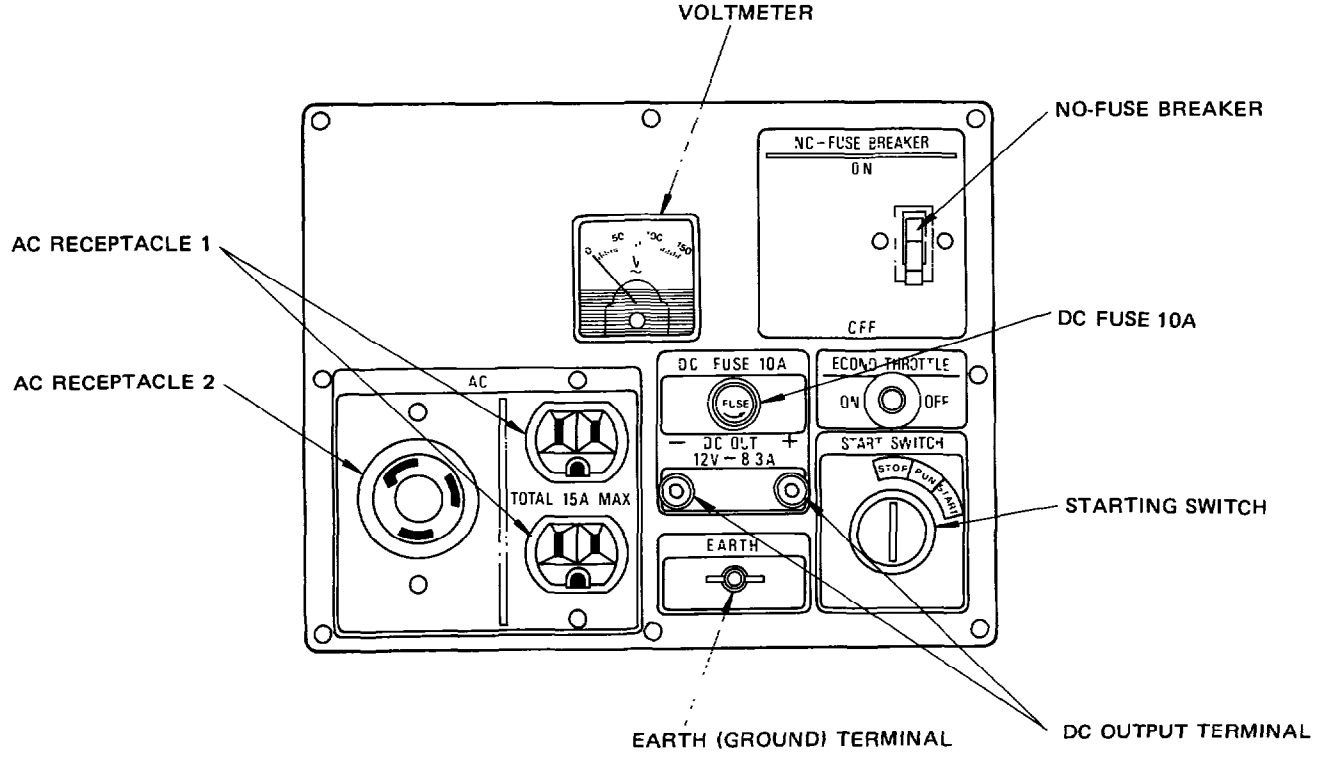
2) ELECTRIC STARTER TYPE–220V, 230V, 240V



3) HAND STARTER TYPE–110V, 120V

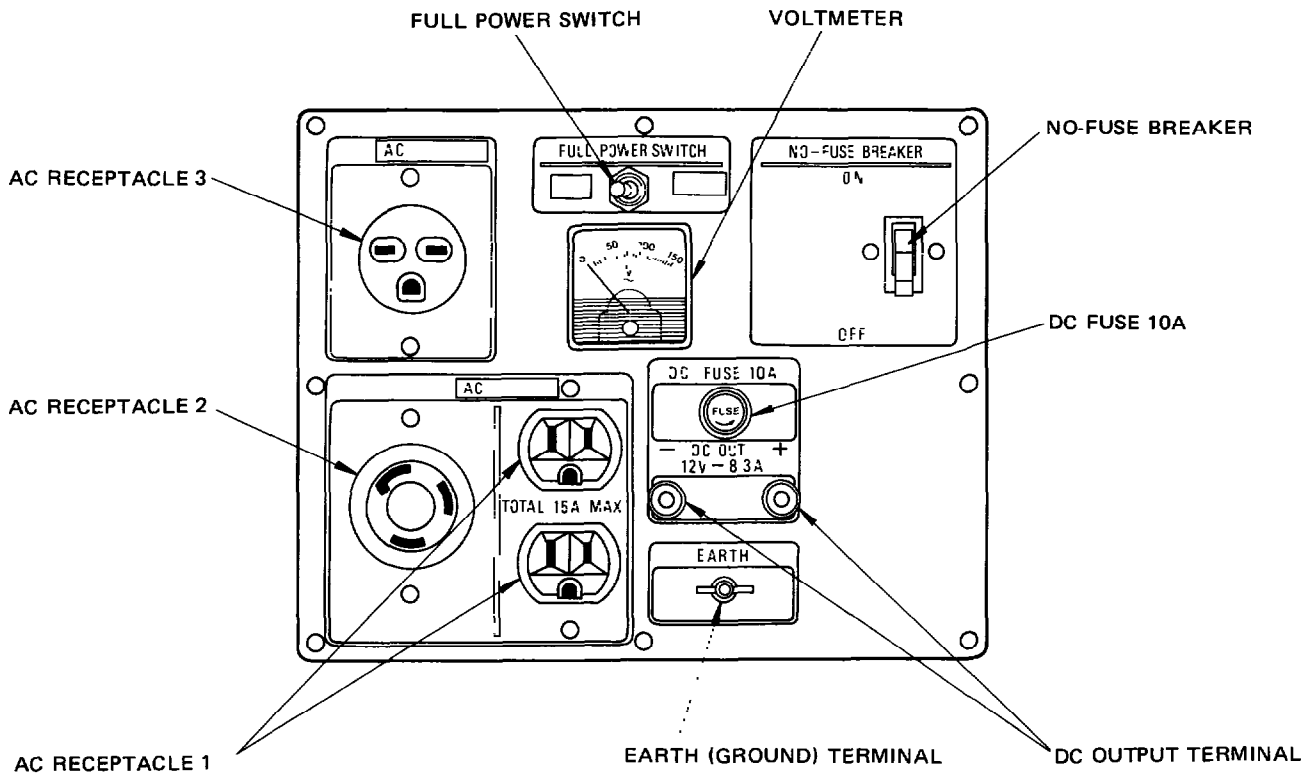


4) ELECTRIC STARTER TYPE–110V, 120V

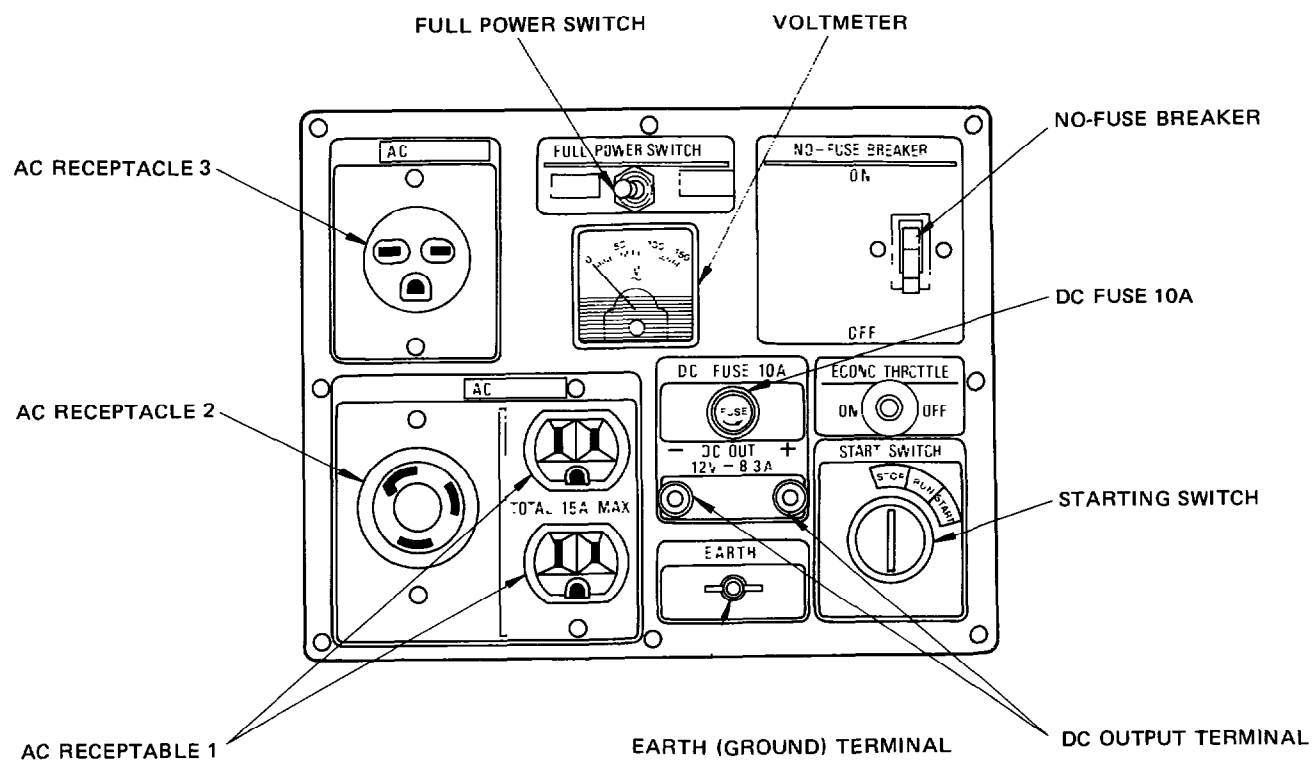


4-2-2 RGD351D

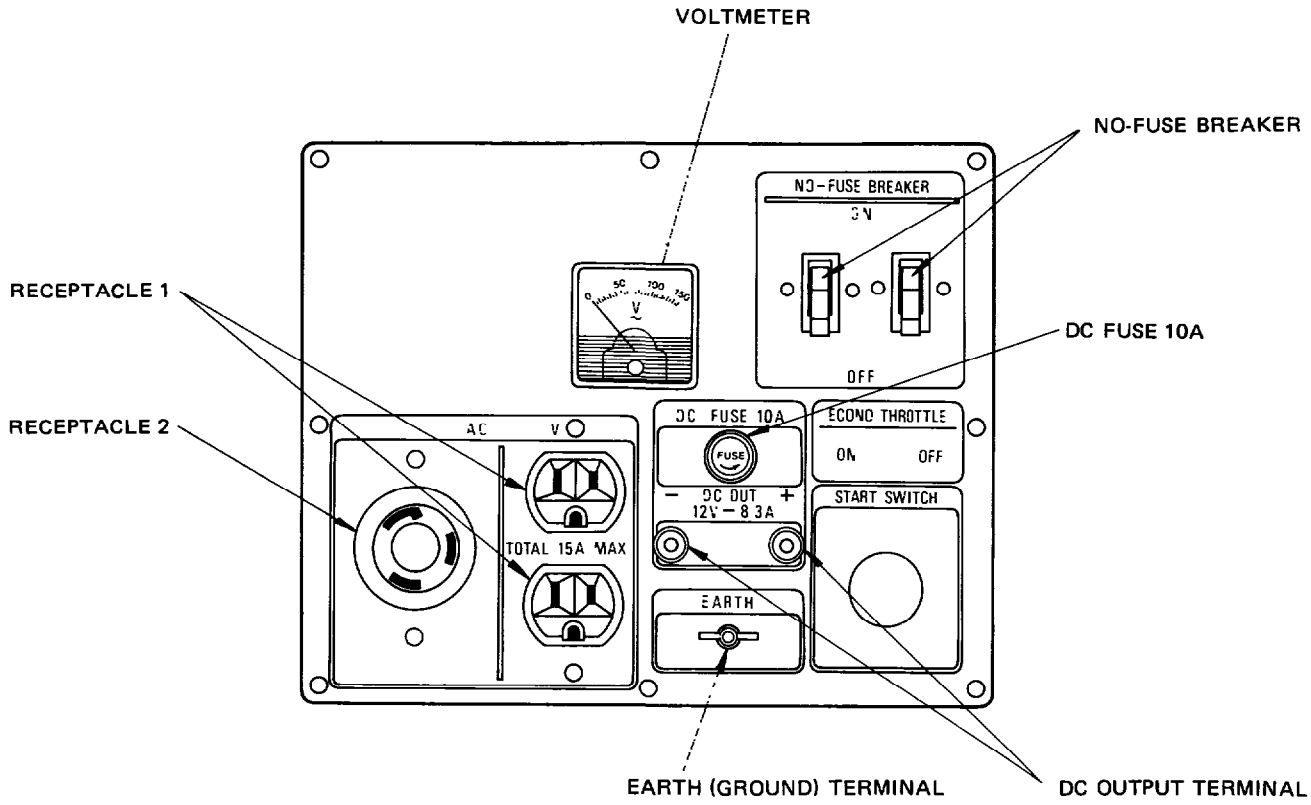
1) HAND STARTER TYPE—dual voltage type



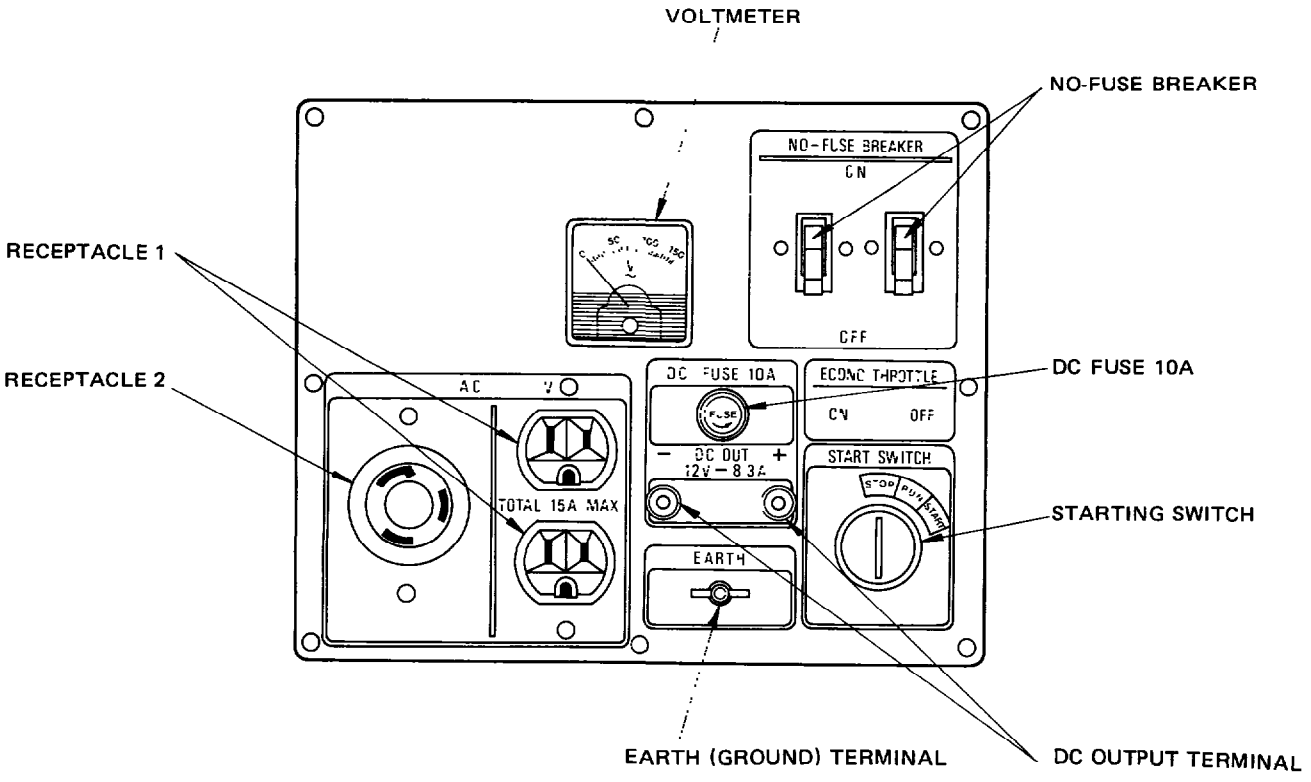
2) ELECTRIC STARTER TYPE—dual voltage type



3) HAND STARTER TYPE–110V, 120V

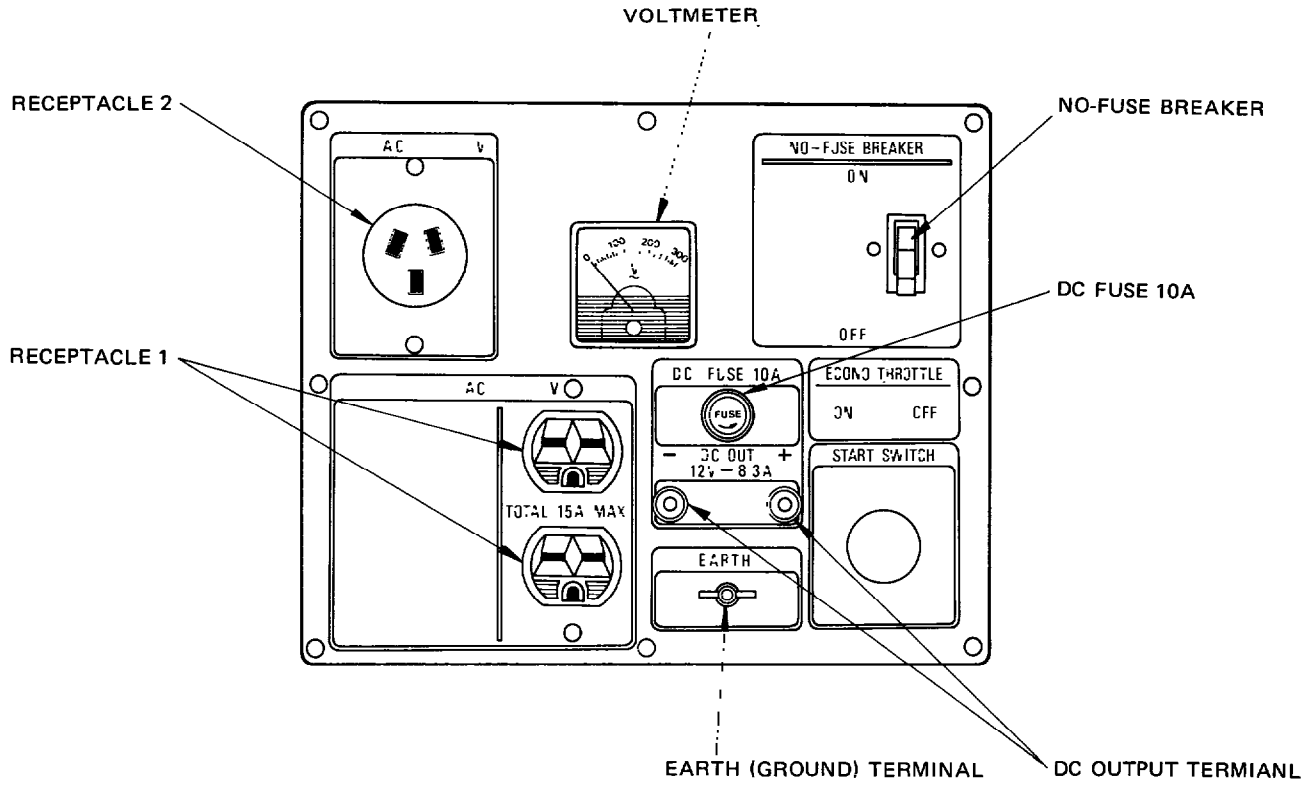


4) ELECTRIC STARTER TYPE–110V, 120V

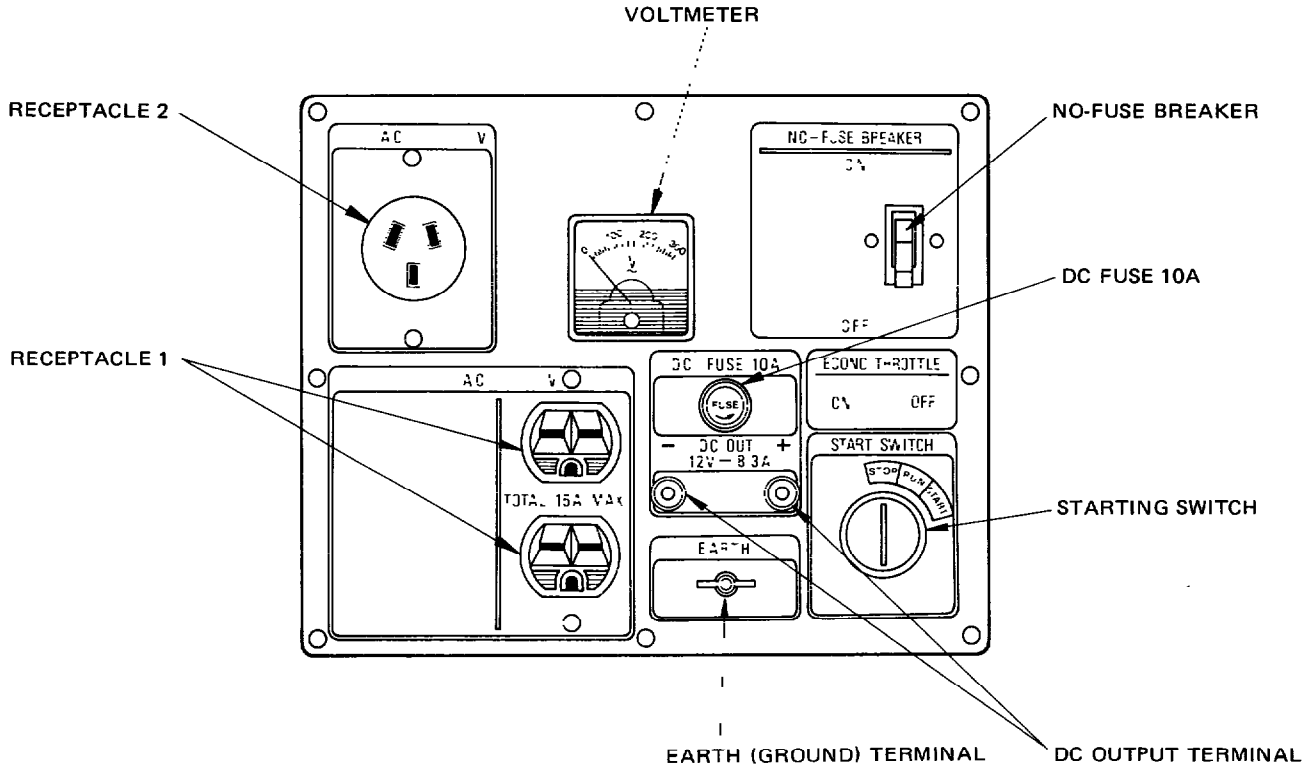


4-2-3 RDG500

1) HAND STARTER TYPE–220V, 230V, 240V

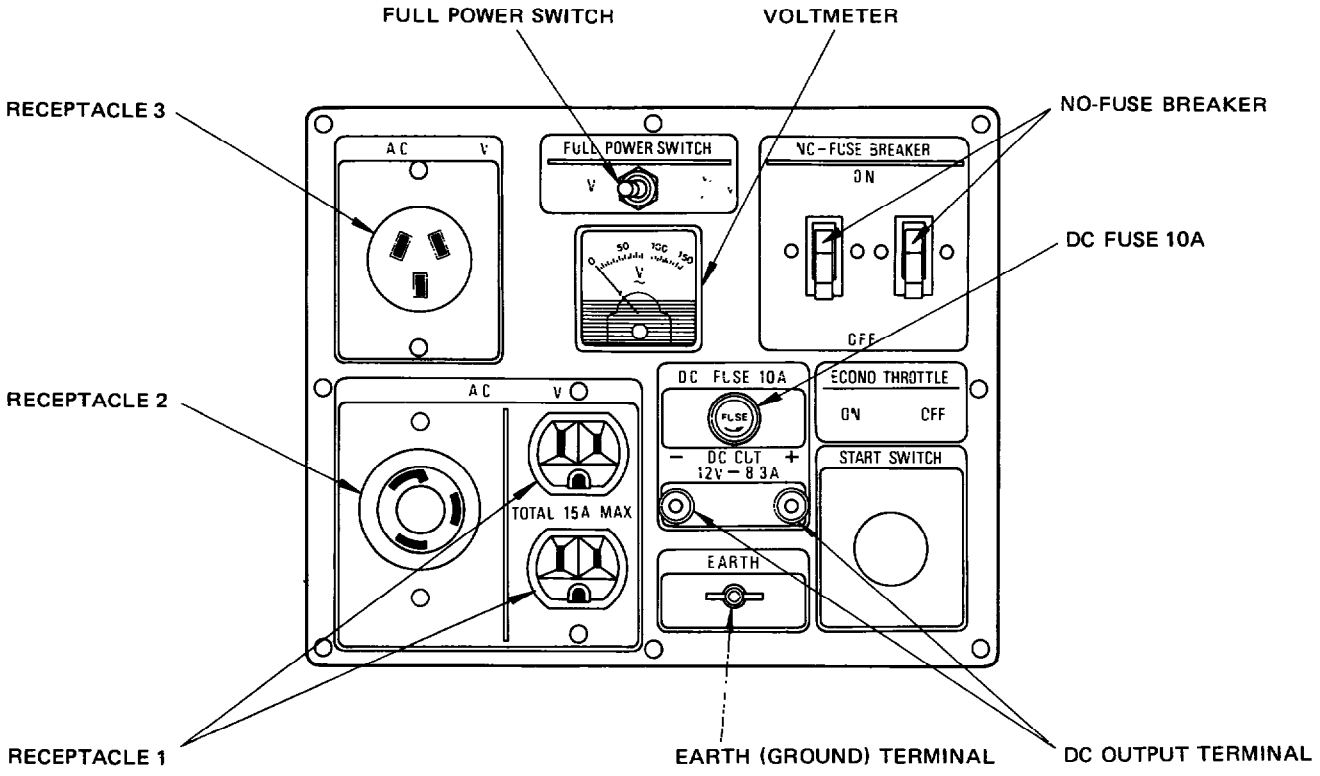


2) ELECTRIC STARTER TYPE–220V, 230V, 240V

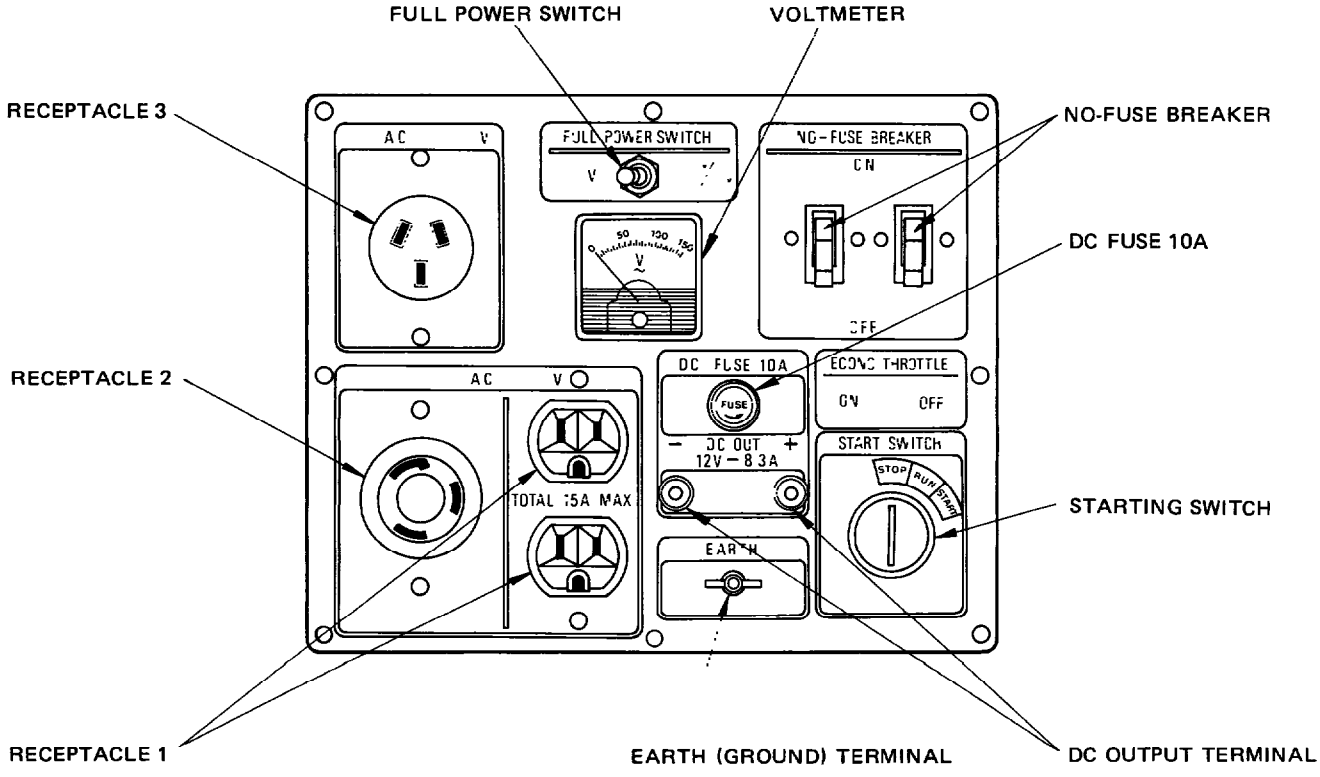


4-2-4 RGD500D

1) HAND STARTER TYPE

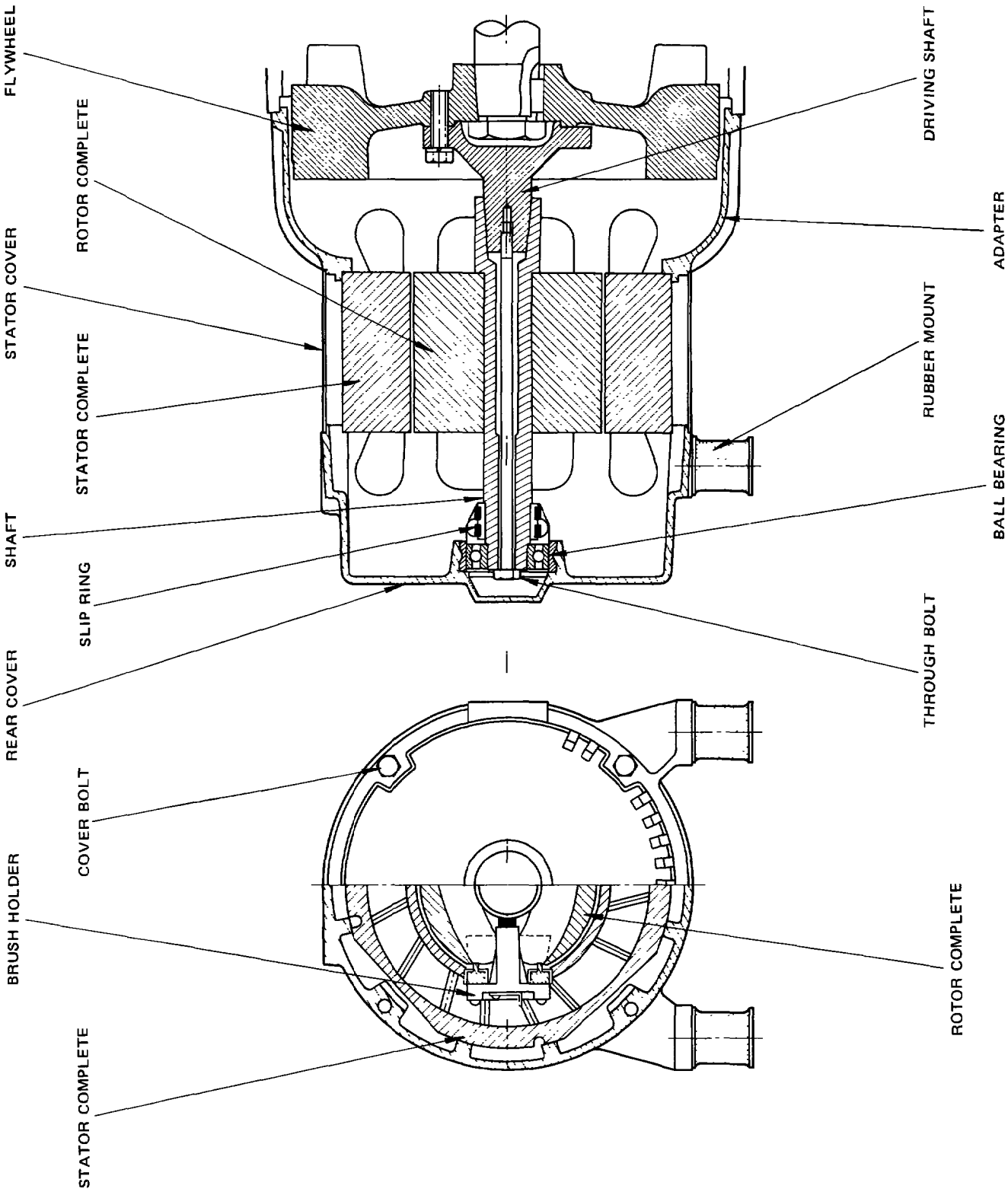


2) ELECTRIC STARTER TYPE



5. CONSTRUCTION and FUNCTION

5-1 CONSTRUCTION



5-2 FUNCTIONS

5-2-1 STATOR

The stator consists of a laminated silicon steel sheet core, copper wire which winds the core, and lead wires which deliver the power. The copper wire is wound into the main coil, sub (auxiliary) coil, and DC coil. AC output power is taken from the main coil, and DC output power from the DC coil. The outside diameters and laminated core thicknesses of various models are as shown below.

Fig. 5-1

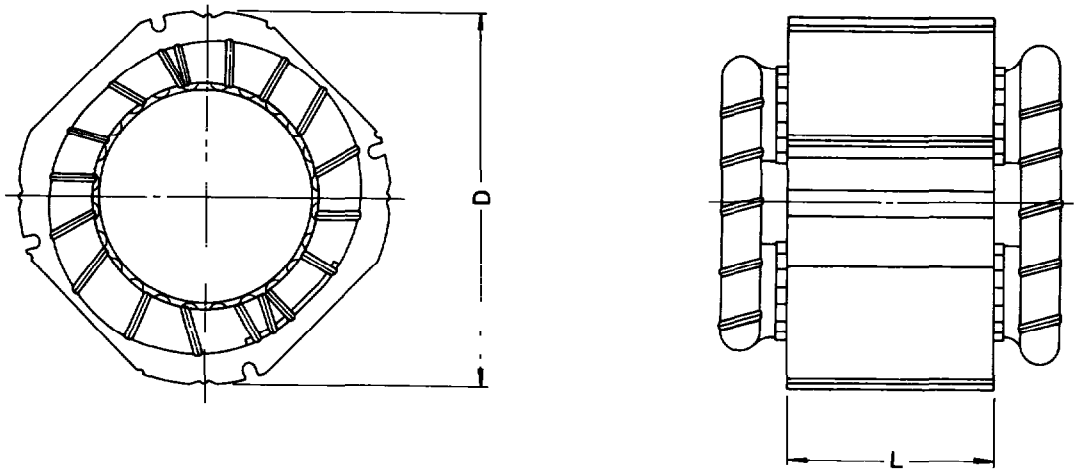


Fig. 5-2

MODEL		RGD351 RGD351D	RGD500 RGD500D
D	(mm)	204	204
	(inch)	8.03	8.03
L	(mm)	70	100
	(inch)	2.76	3.94

Table 5-1

5-2-2 ROTOR

The field coil is wound over a laminated silicon steel sheet core, and to the end of its shaft slip ring is fitted. An end of the field coil lead is connected to the slip ring. When DC current is sent to the field coil through this connecting point, it becomes an electromagnet.

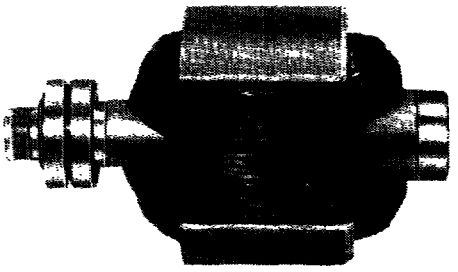


Fig. 5-3

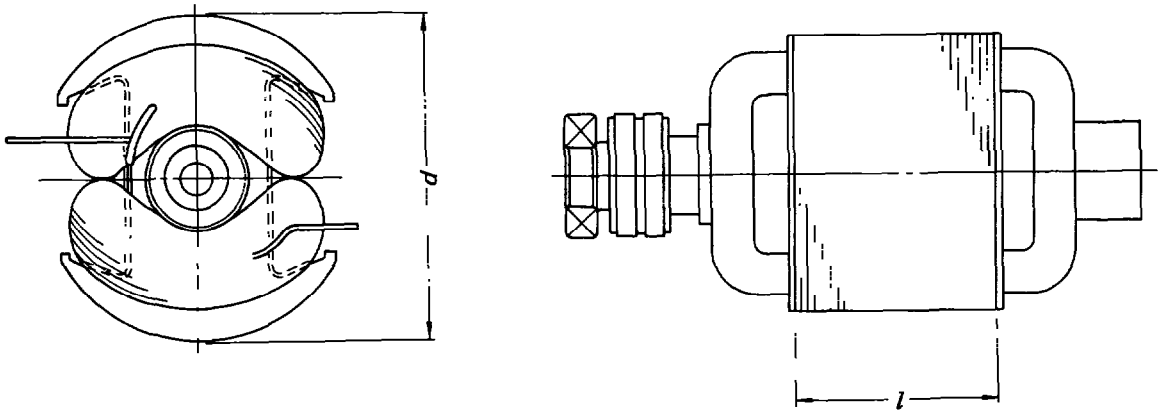


Fig. 5-4

MODEL		RGD351 RGD351D	RGD500 RGD500D
d	(mm)	118	118
	(inch)	4.65	4.65
l	(mm)	70	100
	(inch)	2.76	3.94

Table 5-2

5-2-3 BRUSHES

An exciting current is supplied from the AVR to the rotor. The brushes are made of carbon; and the brush-holders of plastic. It is necessary to keep the contact pressure between the brushes and slip rings within specified limits. Thus, care must be taken of brush length. (See **9-3 BRUSHES.**)

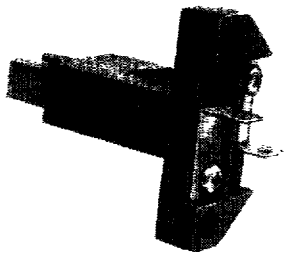


Fig. 5-5

5-2-4 AVR (AUTOMATIC VOLTAGE REGULATOR)

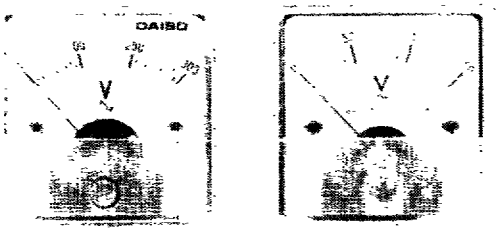
The automatic voltage regulator employs an electronic circuit to automatically regulate voltage.

RGD351, RGD351D RGD500, RGD500D

Fig. 5-6

5-2-5 VOLTMETER

The voltmeter comes in two types, a 150V maximum type and a 300V maximum type. The voltmeter indicates generator output voltages. The generators with a generated voltage of 110V, 120V type and dual voltage type use the 150V maximum type voltmeter; and those of 220V, 230V, and 240V type specifications use the 300V maximum type voltmeter.



300 V MAX.
(220 V, 230 V, 240 V)

150 V MAX.
(110 V, 120 V)

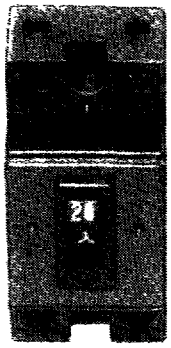
Fig. 5-7

5-2-6 NO-FUSE BREAKER

The no-fuse breaker prevents AC output overcurrent and shortcircuit overcurrent.

Some models have one no-fuse breaker, and the other have two. The single no-fuse breaker protects the generator from maximum current; and the double no-fuse breakers protect the generator from maximum current, and its receptacles.

If the generator is operated for long above the maximum current, the internal temperature of the generator abnormally rises to cause insulation deterioration, burning, electric shock, and electric leakage. The no-fuse breaker protects the generator from such troubles. The receptacles and AC plug have their own rated capacities. (Refer to 5-2-8 RECEPTACLES and PLUG (STD. SPEC.)) If they are used above the rated current, insulation deterioration, buring, electric shock, or leakage can occur. These troubles are prevented by the no-fuse breaker.



NO-FUSE BREAKER

FUSE HOLDER

Fig. 5-8

Table 5-3 shows breaker capacities and protecting objects.

Model	Specifications	N.F.B.	Protecting Object	N.F.B.	Protecting Object
RGD351	110V, 120V	30A	Maximum current		
	220V, 230V, 240V	15A	Maximum current		
RGD351D	110/220V, 120/240V	15A(2P2E*)	Maximum current		
RGD500	50Hz-110V, 60Hz-120V	40A	Maximum current	30A	30A Receptacle
	60Hz-110V	45A	Maximum current	30A	30A Receptacle
	50Hz-220V, 230V, 240V	20A	Maximum current		
	60Hz-220V	25A	Maximum current		
RGD500D	50Hz-110/220V, 120/240V	20A(2P2E*)	Maximum current	15A(2P2E*)	30A Receptacle
	60Hz-110/220V	25A(2P2E*)	Maximum current	15A(2p2E*)	30A Receptacle

Table 5-3

**2P2E means the bipolar double-element type, and if either of two pairs of currents running through the no-fuse breaker exceeds the rated current, the no-fuse breaker operates to turn power off.*

The 220V, 230V, and 240V types use the two pairs connected in series, and the 110V and 120V type have them connected in parallel.

5-2-7 FUSE

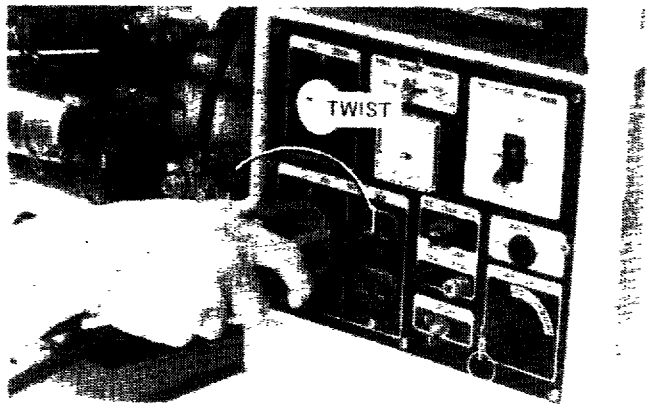
The fuse prevents DC output overcurrent and shortcircuit overcurrent. If the generator is operated at a level exceeding the maximum current, it can cause insulation deterioration, burning, electric shock, and electric leakage. The fuse protects the generator from these troubles. Fuse capacity: 10A

5-2-8 RECEPTACLE and AC PLUG (STD. SPEC.)

These are used for taking AC output power from the generator. A total of five kinds of receptacles, each varying in rated voltage and current from another, are used. Each model has at least one receptacle to deliver the rated generator output. As many AC plugs as the receptacles, each matching the corresponding receptacle, are provided. Table 5-4 shows the rated current for each receptacle. Be careful not to use the receptacles and AC plugs beyond the specified limits to prevent burning.

	up to total 15 amperes from two receptacles
	up to 15 amperes
	up to 20 amperes
	up to 30 amperes (See Caution.)

Table 5-4



Caution: Taking out power from TWIST LOCK RECEPTACLE, put the plug into outlet and turn clockwise to lock it.

Fig. 5-9

NOTE: If your generator has receptacles peculiar to your contry, Table 5-4 does not apply.

NOTE: The generator for U.S.A. and Canadian markets has receptacles to satisfy NEMA Standards. Use the plug matching the corresponding receptacle, referring to the NEMA Standards shown in Table 5-5.

Shape	Voltage and Amp.	Receptacle NEMA Standard No.	AC Plug NEMA Standard No.
	125V 2 receptacles totalling 15A	5-15R	5-15P
	250V 15 A	6-15R	6-15P
	250V 20A	L6-20R	L6-20P
	125V 30A	L5-30R	L5-30P

Table 5-5

5-2-9 TERMINALS

The terminals are for providing DC output power, and come in two colors, red and black. The red one is positive (+), and the black one negative (–).

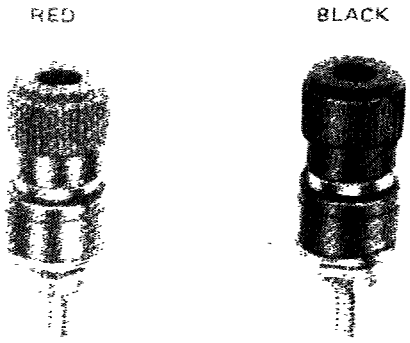


Fig. 5-10

5-2-10 REAR COVER

The terminals are for providing DC output power, and joint to hold the stator. It has bosses inside for holding the brushes, and slits for taking cooling air in. The slits are so designed that human fingers will not go in.

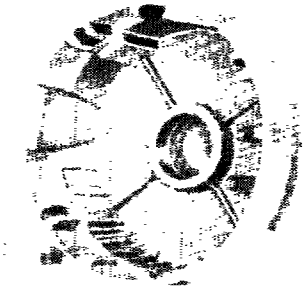


Fig. 5-11

5-2-11 RUBBER MOUNTS (RUBBER VIBRATION ISOLATORS)

Rubber pads for controlling generator vibration and dislocation. These are made of the most suitable rubber material to optimum shape and hardness.

Model RGD351 uses two types of rubber mounts, one is used between the generator and frame and the other under the frame. However, those models with castors require no rubber mounts under the frame. The rubber mounts under the engine are diagonally supported by the mount bracket to reduce the vibration.

Fig. 5-12

5-2-12 PIPE FRAME

The frame consists of pipe frame skeleton, side plates A and B. To this frame a base, stay, etc. for mounting will be fitted.

5-3 DESCRIPTION of GENERATOR OPERATION

5-3-1 PRIMARY EXCITING ACTION

The RGD351, RGD351D and RGD500, RGD500D employ an exciting coil in the engine magneto for raising the primary voltage. This action is explained as follows.

The RGD551, RGD1101 and RG Series generate a voltage when the generator is started again because of the residual magnetism remaining in the yokes and poles. If a generator of this type is disassembled and stored for a long period of time, the residual magnetism may dissipate so that the generator may not generate a voltage when it is restarted. The RGD351, RGD351D and RGD500, RGD500D have an exciting coil for primary exciting action to eliminate such a phenomenon.

The primary exciting action of the new type is explained below.

When the generator is started, the permanent magnet on the engine rotates to generate a voltage in the exciting coil. This voltage is regulated by a diode in the AVR to feed a current to the generator field coil (FC). (See Fig. 5-13.) The rotor is turned an electromagnet by that current and rotates so that voltages are generated in the stator coils (main coil, sub coil, and DC coil). The voltage generated in the sub coils is operated by the AVR to feed a current to increase the field coil current. (See Fig. 5-14.) As a result, the rotor magnetism increases. This operation is repeated to generate the rated voltage at 50Hz or 60Hz in the main coil and DC coil.

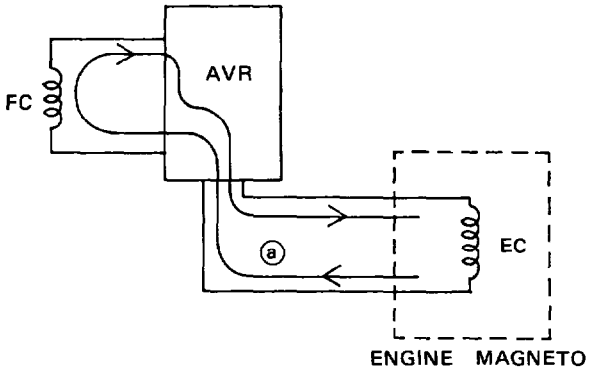


Fig. 5-13

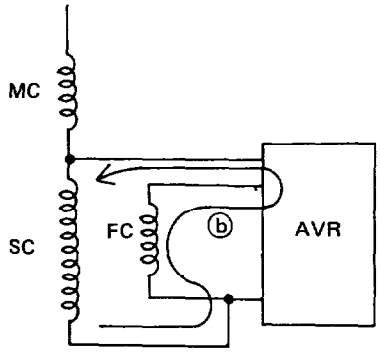


Fig. 5-14

5-3-2 VOLTAGE REGULATING MECHANISM

Connect a load to the AC output terminal and increase current. Output voltage varies as shown in Fig. 5-15 depending on whether an automatic voltage regulator is used or not. The operation of the AVR is explained below.

When an AC output is taken, the engine is loaded and its rpm falls. Also the AC voltage falls due to the voltage drop caused by the internal resistance of the coils. The AVR detects this voltage drop and its built-in SCR automatically increases the current flows to the field coil. As a result, the rotor magnetism increases, the voltage fallen by the load current is raised, and the output voltage is kept constant. If the AC output is reduced, the SCR operates in the opposite way to similarly keep the output voltage constant.

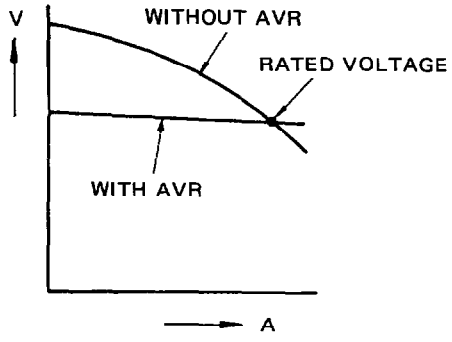


Fig. 5-15

5-3-3 FULL POWER SWITCH

The dual voltage type has a full power switch to produce the rated output from a single 110V or 120V receptacle. The full power switch operates as described below. (The full power switch for 120V/240V is described as the construction of both full power switches for 120V/240V and 110V/220V is same.)

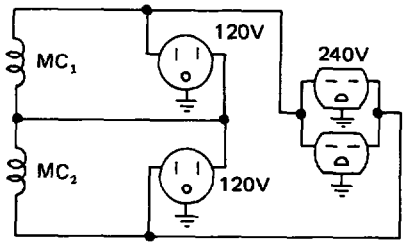


Fig. 5-16

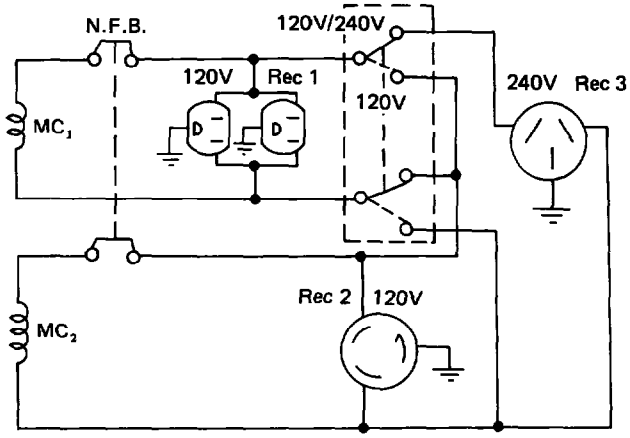


Fig. 5-17

A circuit diagram of the conventional dual voltage type (without full power switch) is shown in Fig. 5-16, and a circuit diagram of the RGD351, RGD351D and RGD500, RGD500D which is fitted with a full power switch is shown in Fig. 5-17. AC windings MC_1 and MC_2 generate a voltage of 120V each.

Switch	LOW VOLTAGE RECEPTACLE	HIGH VOLTAGE RECEPTACLE
110V or 120V	Rated output	Cannot use
110/220V or 120/240V	Half of rated output	Rated output

Table 5-6

Fig. 5-16 shows MC_1 and MC_2 kept connected in series. In this case, an output can be generated from either the 240V or 120V receptacle. The 240V receptacle outputs the rated output (or the maximum output in a short-time operation), but one 120V receptacle can output only one half of the rated output. Since two 120V receptacles are provided, the rated output can be outputted by combining the outputs of the two 120V receptacles.

The RGD351, RGD351D and RGD500, RGD500D shown in Fig. 5-17 change the connection of MC_1 and MC_2 to series or parallel with the full power switch. When the full power switch is shifted to the 120V/240V position, the switch is up as indicated by the solid line in Fig. 5-17, and connects MC_1 and MC_2 in series as shown in Fig. 5-16. In this case, voltages up to the rated level can be outputted from Receptacle 3, and voltages up to one half (120V) of the rated voltage from Receptacle 1 and Receptacle 2. (If the rated current is over 30A at 120V, up to 15A can be outputted from Receptacle 1 as the combined output of the two.) When the full power switch is shifted to the 120V position, the switch is down as indicated by the broken line in Fig. 5-17, and connects MC_1 and MC_2 parallel to each other. In this case, no 240V can be outputted, and Receptacle 3 cannot be used. Receptacle 2, which outputs 120V can generate up to the rated power; and Receptacle 1 can output up to 15A in total. (or up to 30A if the rated current is over 30A at 120V.) The above is summarized in Table 5-6. Use the full power switch as suitable to the voltage and input ratings of the electric devices.

5-4 ENGINE PARTS CHANGED

For a detailed description of the engine, refer to the Service Manual for Robin Diesel Engines, DY30 and DY41.

Models RGD351, RGD351D and RGD500, RGD500D use a special engine and special engine parts. These parts can be classified into generator drive parts, exciting and charging parts, fuel piping parts, handle bracket parts, and speed control parts. Each of these categories is explained below.

5-4-1 GENERATOR DRIVE

The flywheel has a driving shaft to transmits power from the engine to the generator. The driving shaft is tapered to be coupled to the generator rotor shaft. The adaptor is fixed to the blower housing for mounting the generator stator.

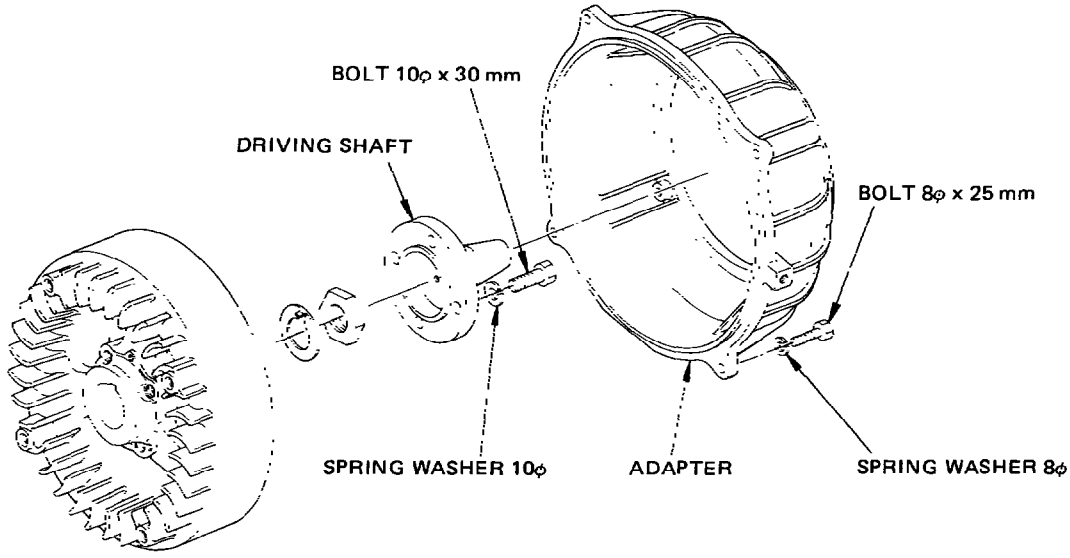


Fig. 5-18

5-4-2 EXCITING and CHARGING

The exciting coil for primary excitation and the charging coil for charging the starter battery for the electric starter type are installed in the bearing holder. Magnets for power generation are installed on the flywheel. There are a total of four leads, two yellow leads for exciting and the other two for charging. The hand starter type uses only the two yellow leads for excitation, not the other two for charging. The electric starter type uses all the four leads.

NOTE: This coil exciting and charging feature is peculiar to the Robin generators. Be careful not to attach different parts because the automatic voltage regulator may break down as a result.

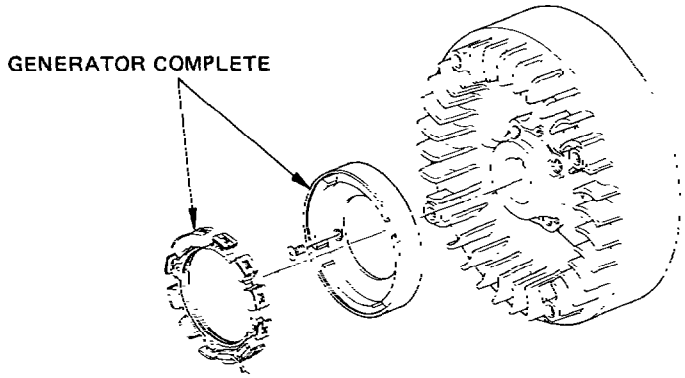


Fig. 5-19

5-4-3 FUEL PIPING

A fuel filter is attached to the adaptor hose to which the fuel pipe, air vent pipe, and return pipes are also connected.

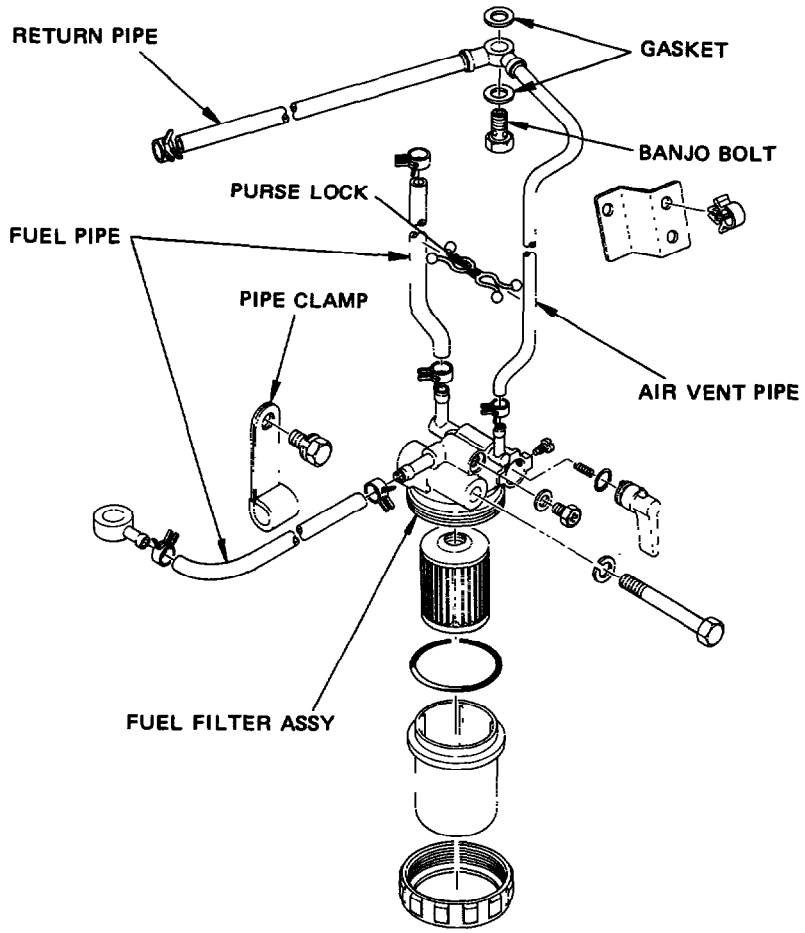


Fig. 5-20

5-4-4 HANDLE BRACKET

The handle bracket is secured to the crankcase and blower housing boss so that the starting handle can be stored. The electric starter type is also provided with the starting handle and bracket, and therefore can be started both electrically and by cranking.

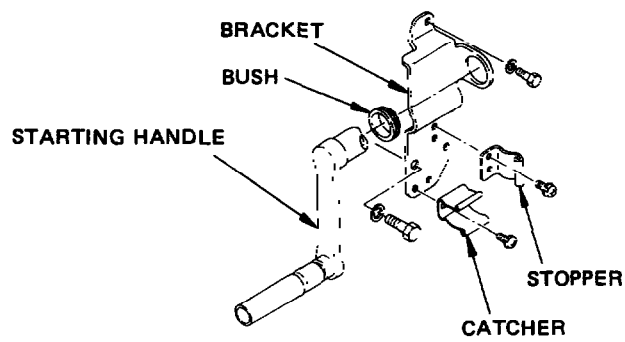


Fig. 5-21

5-4-5 SPEED CONTROL

Generator speed can be easily changed by means of the speed control.

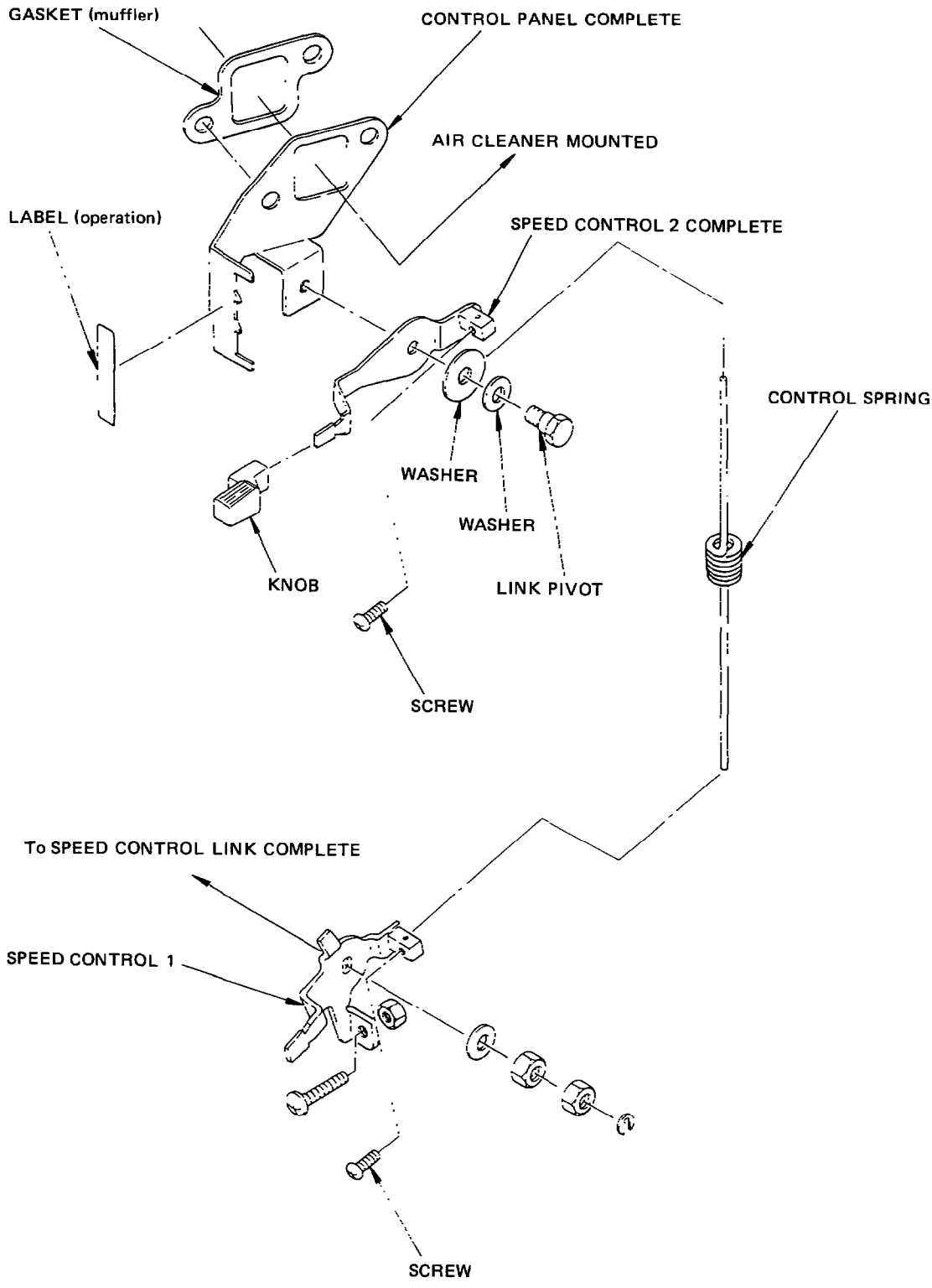


Fig. 5-22

6. SAFETY PRECAUTIONS

1. **Use extreme caution near fuel. A constant danger of explosion or fire exists.**
   Do not fill the fuel tank while the engine is running. Do not smoke or use open flame near the fuel tank. Be careful not to spill fuel when refueling. If spilt, wipe it and let dry before starting the engine.

2. **Do not place inflammable materials near the generator.**
   Be careful not to put fuel, matches, gunpowder, oil cloth, straw, trash and any other inflammables near the generator.

3. **Do not operate the generator in a room, cave or tunnel. Always operate in a well-ventilated area.**
   Otherwise the engine may become overheated and also, the poisonous carbon monoxide contained in the exhuast gases will endanger human lives. Keep the generator at least 1 m (4 feet) away from structures or facilities during use.

4. **Operate the generator on a level surface.**
   If the generator is tilted or moved during use, there is a danger of fuel spillage and a chance that the generator may tip over.

5. **Do not operate with wet hands or in the rain.**
   Severe electric shock may occur. If the generator is moistened by rain or snow, wipe it and fully dry it before starting. Don't pour water over the generator directly or wash it with water.
   If the generator is wet with water, the insulations will be adversely affected and may cause current leakage and electric shock.

6. **Do not connect the generator to the commercial power lines.**
   This may cause a short-circuit or destroy the generator. Use a transfer switch for connecting with indoor wiring.
   NOTE: The parts numbers of the transfer switches and of the plastic box to store them are as shown in Table 6-1.

Part No.	Part Name	Q'ty	Phase	Allowable Current
365 45604 08	Transfer Switch	1	1	15A
367 45605 08	Transfer Switch	1	1	30A
340 45606 08	Transfer Switch	1	1	60A
340 45608 08	Transfer Switch	1	3	15A
348 45609 08	Transfer Switch	1	3	30A
367 43008 08	Plastic Box	1	1, 3	30A
348 43009 08	Plastic Box	1	1	60A

Table 6-1

7. **Use fuses of the correct capacity.**
   If the generator rpm is increased exorbitantly in the overload condition by using a fuse in excess of the rated capacity, the generator could be burnt and the AVR be damaged.
   CAUTION: If the fuse is burnt out or the circuit breaker tripped off as a result of using an electrical appliance, the cause can be an overload or a short-circuit. In such a case, stop operation immediately and carefully check the electrical appliance and AC plugs for faulty wiring.

7. APPLICABLE RANGES of GENERATOR

Generally, the rated power of an electrical appliance often refers to the amount of work that can be done by it. The electric power required for operating an electrical appliance is not necessarily equal to the amount of work that can be done by it. Electrical products generally have a label showing their rated voltage, frequency, and power consumption (input power). The power consumption of an electrical product is the power necessary for using it. When using a generator for operating an electrical product, however, the power factor and starting current must also be taken into consideration.
Determine the required capacity of your generator from the power required for operating electrical products that are classified as follows.

1. **Incandescent lamps, hot plates, etc. with a power factor of 1.0**
   Total power consumption must be equal to or less than the rated output of the generator.
   Example: A generator with a rated output power of 1000W can light ten 100W lamps.

2. **Fluorescent lamps, mercury lamps, etc. with a smaller power factor**
   Select a generator with a rated output equivalent to 1.2 to 2 times the power consumption of the load.
   Example: A generator with a capacity of 100W to 160W is necessary for lighting a 80W fluorescent lamp. A generator with a rated output of 1000W can light 6 to 10 fluorescent lamps of 40W.
   NOTE: Wattage of the fluorescent lamp generally does not indicate the power consumption but indicates the output of the lamp. Therefore, if the fluorescent lamp has no special indication as to the power consumption or input power, efficiency should be taken into accounts as explained in **Item 5** *on the following page.*

3. **Electric tools, etc. that are driven by a motor**
   Power 1.2 to 3 times the power consumption of a motor-driven tool is required for starting so select a generator with a maximum output 1.2 to 3 times the power sonsumption of the load.
   Example: A 300W motor-driven drill requires a generator with a maximum output of 400 to 900W or more.

4. **Water pumps, compressors, etc. that are driven by a motor which is loaded at starting.**
   3 to 5 times the power consumption of the load is necessary for starting so select a generator with a maximum output 3 to 5 times its power consumption.
   Example: A water pump with a power consumption of 40W requires a generator with a maximum output of 1200 to 2000W or more.
   NOTE 1: Motor-driven products mentioned in **Items 3** *and* **4** *required the aforementioned generator capacities only when starting their motors. Once their motors are started, the products consume only about 1.2 to 2 times their rated power consumption so that the excess power generated by the generator can be used for other electrical appliances.*
   NOTE 2: Motor-driven products mentioned in **Items 3** *and* **4** *vary in their required motor starting power depending on the kind of motor and start-up load. If it is difficult to determine the optimum generator acpacity, select a generator with a larger capacity.*

5. **Appliances without any indication as to power consumption**

Some appliances have no indication as to power consumption; but instead the work load (output) is indicated. In such a case, power consumption is to be worked out according to the numerical formula mentioned below.

$$\frac{\text{(Output of electrical appliance)}}{\text{(Efficiency)}} = \text{(Power consumption)}$$

Efficiencies of some electrical appliances are as follows:

Single-phase motor . . . . . 0.6 ~ 0.75
Three-phase motor . . . . . 0.65 ~ 0.9
Fluorescent lamp . . . . . 0.7 ~ 0.8

The smaller the capacity, the worse the efficiency, and vice versa.

Example 1: A 40W fluorescent lamp means that its luminous output is 40W. Its efficiency is 0.7 and accordingly, power consumption will be 40 ÷ 0.7 = 57W. As explained in **Item 2**, multiply this power consumption value of 57W by 1.2 ~ 2 and you will get the figure of the necessary capacity of a generator. In other words, a generator with a rated output of 1000W capacity can light 9 ~ 14 fluorescent lamps of 40W.

Example 2: Generally speaking, a 400W motor means that its work load is 400W. Efficiency of this motor is 0.7 and power consumption will be 400 ÷ 0.7 = 570W. When this motor is used for a motor-driven tool, the capacity of the generator should be multipled by 1.2 to 3 and 570W as explained in the **Item 3**. Moreover, in case when used this motor for the pump in the water or compressor, it is necessary 3 ~ 5 times powerful generator according to the **Item 4**.

Model	RGD351 RGD351D		RGD500 RGD500D	
Frequency	50Hz	60Hz	50Hz	60Hz
Incandescent lamp hot plate, etc.	3000W	3300W	4300W	4500W
Fluorescent lamp, mercury lamp, etc.	about 2000W	about 2200W	about 2850W	about 3000W
Motor-driven tool, general-purpose motor, etc.	about 1500W	about 1650W	about 2200W	about 2300W
Water pump, compressor	about 750W	about 820W	about 1100W	about 1150W

Table 7-1

NOTE: Wiring between generator and electrical appliances

1. *Allowable current of cable*

   Use a cable with an allowable current that is higher than the rated input current of the load (electrical appliance). If the input current is higher than the allowable current of the cable used, the cable will become excessively heated and deteriorate the insulation, possibly burning it out. Table 7-2 shows cables and their allowable current for your reference.

2. *Cable length*

   If a long cable is used, a voltage drop occurs due to the increased resistance in the conductors so that the input voltage to the load (electrical product) decreases. As a result, the load can be damaged, table 7-2 shows voltage drops per 100 meters of cable.

Nominal cross section	Allowable current	No. of strands strand dia.	Resistance	Current Amp.							
mm^2	A	No./mm	Ω/100m	1A	3A	5A	8A	10A	12A	15A	Voltage drop
0.75	7	30/0.18	2.477	2.5V	8V	12.5V	–	–	–	–	
1.25	12	50/0.18	1.486	1.5V	5V	7.5V	12V	15V	18V	–	
2.0	17	37/0.26	0.952	1V	3V	5V	8V	10V	12V	15V	
3.5	23	45/0.32	0.517	–	1.5V	2.5V	4V	5V	6.5V	7.5V	
5.5	35	70/0.32	0.332	–	1V	2V	2.5V	3.5V	4V	5V	

Table 7-2

Voltage decrese indicates as $V = \frac{1}{100} \times R \times I \times \ell$

R — means resistance (Ω/100) on the above table.

I — means electric current through the wire (A).

ℓ — means the length of the wire (m).

The length of the wire indicates round length, it means two times of the length from generator to electrical tools.

8. MEASURING PROCEDURE

8-1 METERS

8-1-1 VOLTMETERS

AC and DC voltmeters are necessary. The approximate AC voltage ranges of the voltmeters to be used for various types of generators are as follows:

0 to 150V: Type with an output voltage of 110 or 120V

0 to 300V: Type with an output voltage of 220, 230, or 240V

0 to 150V, 0 to 300V: Dual voltage type

The DC voltmeter range is approximately from 0 to 30V.

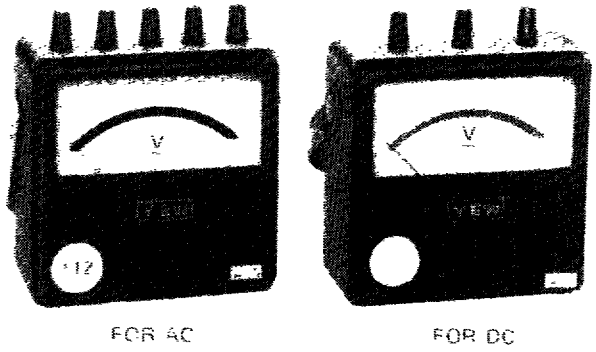


Fig. 8-1

8-1-2 AMMETERS

AC and DC ammeters are necessary. An AC ammeter with a range that can be changed according to the current rating of a given generator is most desirable. (About 10A, 20A, and 100A)

The DC ammeter range is approximately from 0 to 15A.

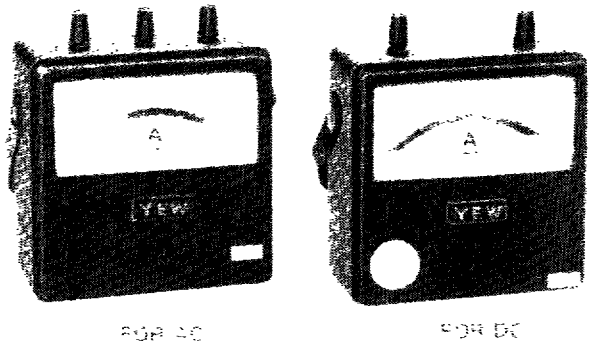


Fig. 8-2

8-1-3 FREQUENCY METER

Frequency range: About 45 to 65Hz

NOTE: Be careful of the frequency meter's input voltage range.

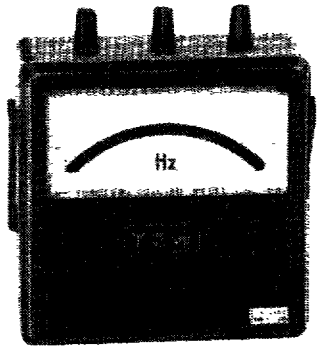


Fig. 8-3

8-1-4 TESTER

Used for measuring resistance, etc.

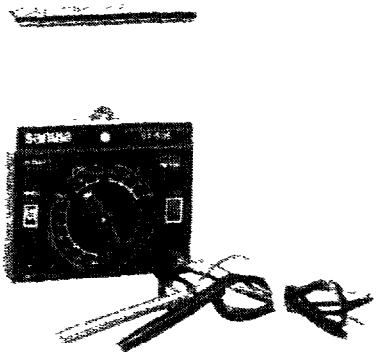


Fig. 8-4

8-1-5 MEGGER TESTER

Used for measuring generator insulation resistance. Select one with testing voltage range of 500V.

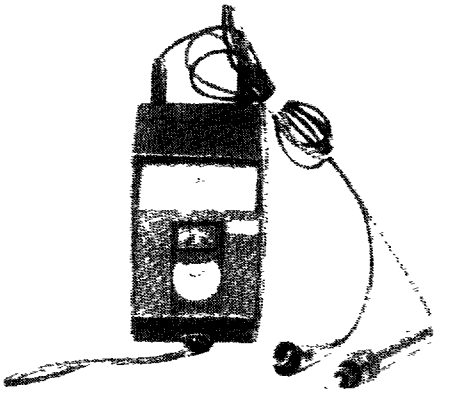


Fig. 8-5

8-1-6 TACHOMETER

There are various types of tachometers. such as contact-less type, contact type, and strobe type. The contact type can be used only when the generator and engine have been disassembled. The contract-less type is recommended.

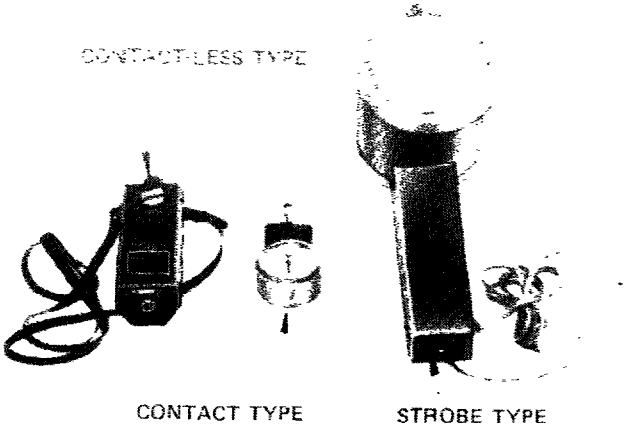


Fig. 8-6

8-2 AC OUTPUT MEASURING

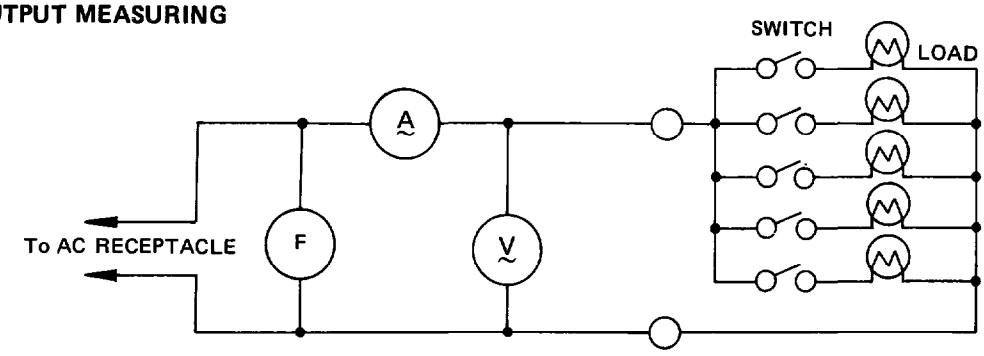


Fig. 8-7

Use a circuit like the one shown in Fig. 8-7 for measuring AC output. A hot plate or lamp with a power factor of 1.0 may be used as a load. Adjust the load and rpm, and check that the voltage range is as specified in Table 8-1 at the rated amperage and rated rpm.

Rated voltage	110V	120V	220V	230V	240V
Voltage range	108 ~ 115V	118 ~ 125V	218 ~ 225V	228 ~ 235V	238 ~ 245V

Table 8-1

8-3 DC OUTPUT MEASURING

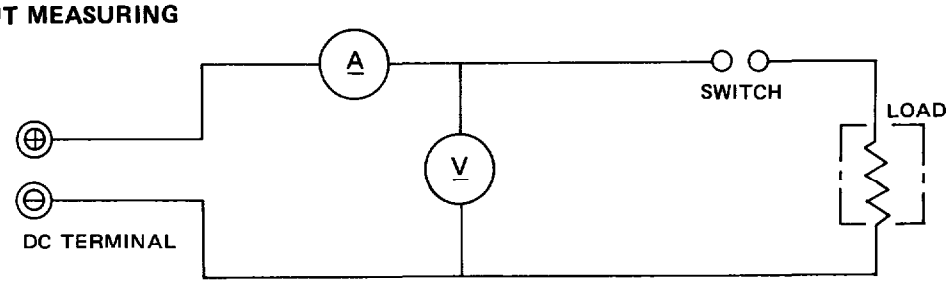


Fig. 8-8

Switch the power on, when 1.45Ω resistance attached as a load, check that the voltage is within the range of 13 to 11V.
NOTE: If a battery is connected as the load, the output voltage increases by about 1 to 2V, possibly causing battery overcharge. Control battery liquid level during charging to prevent overcharging.

8-4 MEASURING INSULATION RESISTANCE

Connect a megger tester to one of the two receptacle output terminals and the ground terminal, then measure the insulation resistance. An insulation resistance of 1 megohm or more is normal. (The original insulation resistance at the time of shipment from the factory is 10 megohms or more.) If it is less than 1 megohm, disassemble the generator and measure the insulation resistance of the stator, rotor and control box individually.

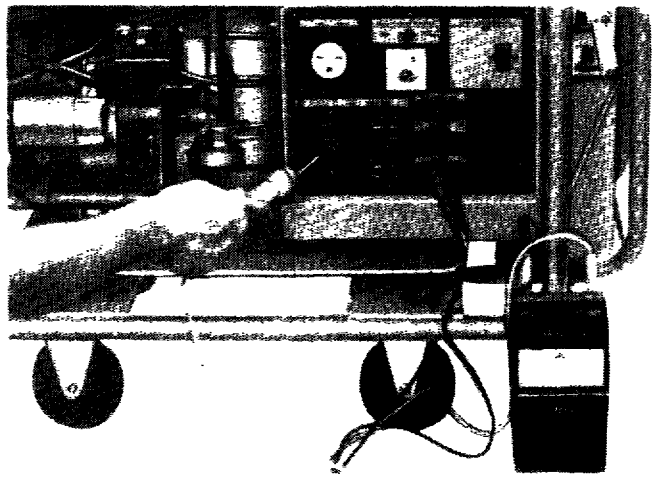


Fig. 8-9

•STATOR

Measure the insulation resistance between the red or white coupler from the stator and the core.

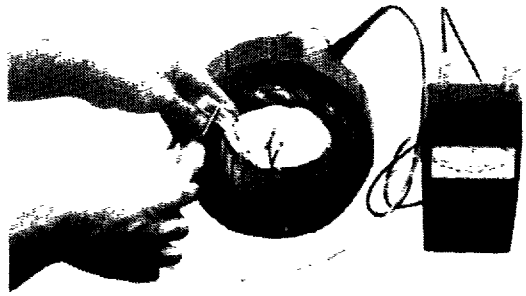


Fig. 8-10

•ROTOR

Measure the insulation resistance between the core and one of the slip rings of the rotor.

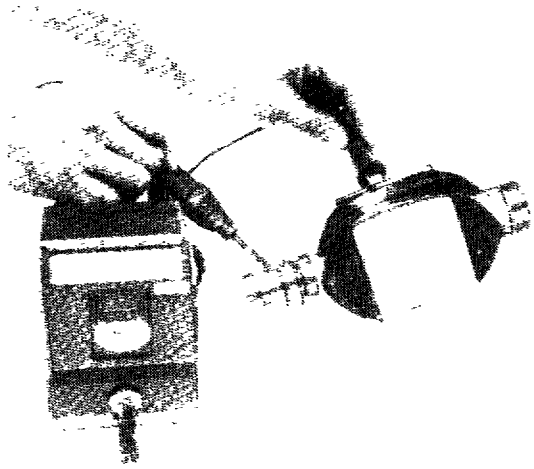


Fig. 8-11

•CONTROL BOX

Measure the insulation between the live parts and the casing or grounded part. Close the no-fuse breaker first, then measure it.

Any part which has an insulation resistance of less than 1 megohm has a faulty insulation, which can cause electric shock or leakage. Replace such parts.

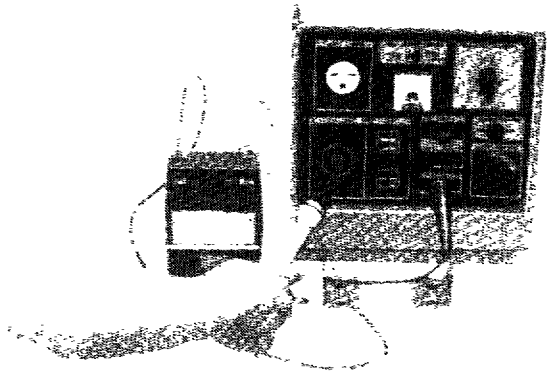


Fig. 8-12

9. CHECKING FUNCTIONAL MEMBERS

9-1 STATOR ASSEMBLY

9-1-1 MEASURING WINDING RESISTANCE

Check the resistance of the leads from the stator with a tester. (See Fig. 9-1.)

Check all the leads which are shown by type in the tables below. Any lead which is inactive is faulty.

NOTE: Testers are not so accurate that some margin of error must be taken into account when reading the tester against the values shown in the Tables.

It is measured by wheatstone bridge in regularly. In this time, please care enough not to exist the contact registance.

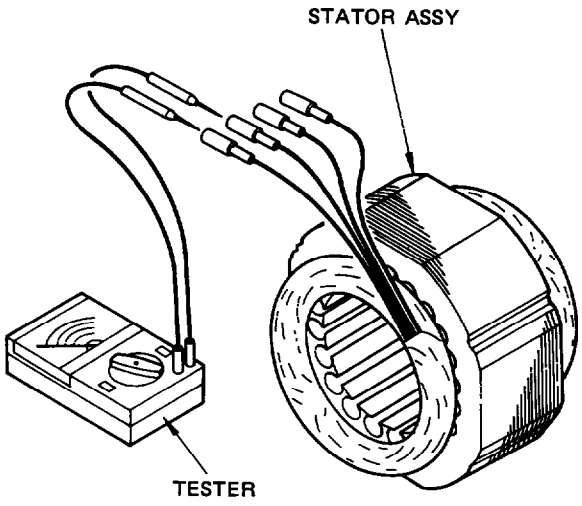


Fig. 9-1

★RGD351, RGD351D

• 50Hz-220V, 230V, 240V

Wire color	RED	GREEN
WHITE	1.4 Ω	2.7 Ω

Wire color	BLUE
BLUE	0.2 Ω

• 50Hz-110V, 50Hz-110V/220V, 50Hz-120V/240V

Wire color	RED	GREEN
WHITE	0.7 Ω	2.7 Ω

Wire color	YELLOW
BLACK	0.7 Ω

Wire color	BLUE
BLUE	0.2 Ω

• 60Hz-110V, 60Hz-120V, 60Hz-110V/220V, 60Hz-120V/240V

Wire color	RED	GREEN
WHITE	0.5 Ω	2.2 Ω

Wire color	YELLOW
BLACK	0.5 Ω

Wire color	BLUE
BLUE	0.2 Ω

• 60Hz-220V

Wire color	RED	GREEN
WHITE	1.0 Ω	2.2 Ω

Wire color	BLUE
BLUE	0.2 Ω

★**RGD500, RGD500D**

• 50Hz-220V, 230V, 240V

Wire color	RED	GREEN
WHITE	0.7 Ω	1.6 Ω

Wire color	BLUE
BLUE	0.14 Ω

• 50Hz-110V, 50Hz-110V/220V, 50Hz-120V/240V

Wire color	RED	GREEN
WHITE	0.35 Ω	1.6 Ω

Wire color	YELLOW
BLACK	0.35 Ω

Wire color	BLUE
BLUE	0.14 Ω

• 60Hz-110V, 60Hz-120V, 60Hz-110V/220V, 60Hz-120V/240V

Wire color	RED	GREEN
WHITE	0.2 Ω	1.3 Ω

Wire color	YELLOW
BLACK	0.2 Ω

Wire color	BLUE
BLUE	0.12 Ω

• 60Hz-220V

Wire color	RED	GREEN
WHITE	0.4 Ω	1.3 Ω

Wire color	BLUE
BLUE	0.12 Ω

9-1-2 MEASURING INSULATION RESISTANCE

Refer to **8-4 MEASURING INSULATION RESISTANCE.**

9-2 ROTOR ASSEMBLY

9-2-1 WINDING RESISTANCE MEASURING

Check the resistance between the two slip rings with a tester. (See Fig. 9-2.)

The resistance is normal if it is anywhere from 5 ohms to 10.5 ohms.

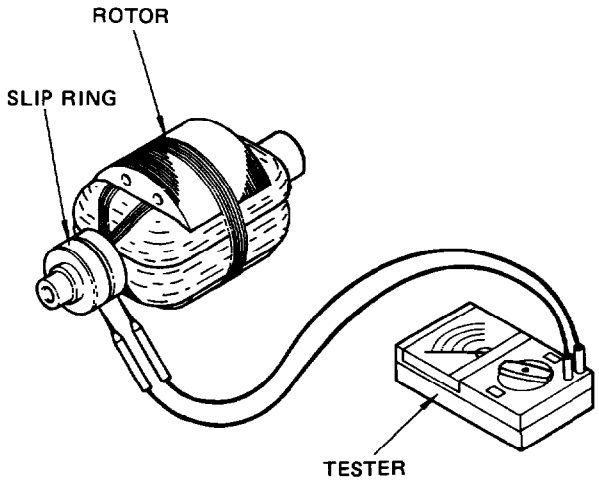


Fig. 9-2

9-2-2 MEASURING INSULATION RESISTANCE

Refer to **8-4 MEASURING INSULATION RESISTANCE.**

9-2-3 CLEANING SLIP RINGS

The slip ring surfaces must be uniformly bright. Slip rings showing black spots, excessive wear, or uneven wear must be repaired. A stained slip ring lowers generator efficiency and output voltage. Polish the slip rings with fine sandpaper while turning the rotor until rough spots disappear. Care should be taken not to touch the rotor coils with the sandpaper. (See Fig. 9-3.)

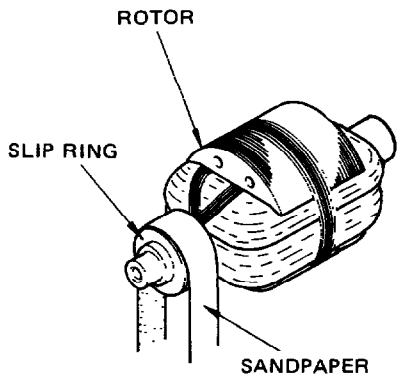


Fig. 9-3

9-3 BRUSHES

The brushes must be smooth where they contact the slip rings. If not, polish smooth the brushes with sandpaper. A brush that is not smooth produces arcs between the brush and slip ring leading to possible damage. Usable brush lengths are from 5 mm to 15 mm as shown in Fig. 9-4. A brush shorter than 5 mm must be replaced because decreased contact pressure between the brush and slip ring lowers generator efficiency and output voltage.

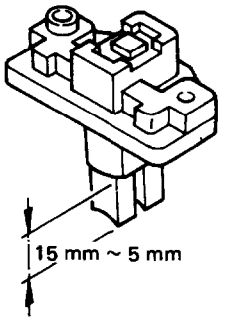


Fig. 9-4

9-4 AVR (AUTOMATIC VOLTAGE REGULATOR)

AVR trouble may be identified by simply looking at the AVR, or by checking the inter-lead resistance with a tester, or actually mounting it in the generator and operating it.

9-4-1 AVR TROUBLE IDENTIFICATION by APPEARANCE

If an AVR electronic part is burnt dark, or the surface epoxy resin melted, it often indicates AVR trouble.

9-4-2 IDENTIFYING AVR TROUBLE by CHECKING INTER-LEAD RESISTANCE

Check the inter-lead resistance of the AVR with a tester. (See Fig. 9-5.) If the tester readings vary greatly from the values specified in the table on next page, the AVR is faulty.

NOTE: Take tester inaccuracy into account in reading the tester.

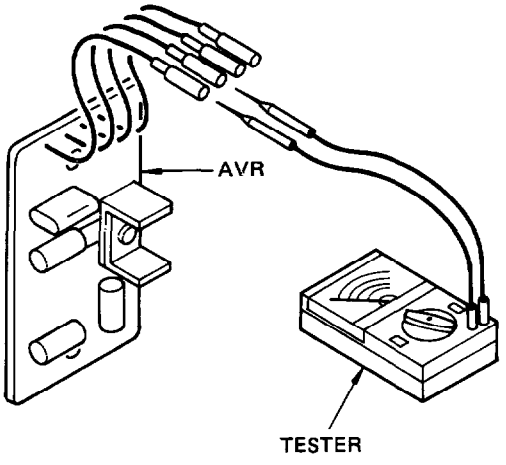


Fig. 9-5

9-4-3 IDENTIFYING AVR TROUBLE by MOUNTING and OPERATING in THE GENERATOR

SCR or transistor damage cannot be detected by simply looking at the AVR or checking the lead resistances. Check it by mounting the suspectedly faulty AVR in a normal generator, or mount a normal AVR in a generator which fails to generate voltage.

MODEL RGD351, RGD351D

Tester polarity (+) \ (−)	Yellow	Red	White	Green	Brown
Yellow	∞	700K ~ 1MΩ	72K ~ 120KΩ	One wire: 0Ω Another: ∞	65K ~ 10KΩ
	∞	400K ~ 500KΩ	72K ~ 120KΩ	One wire: 0Ω Another: ∞	65K ~ 10KΩ
Red	–	–	250K ~ 300KΩ	∞	400K ~ 500KΩ
	–	–	130K ~ 140KΩ	∞	220K ~ 250KΩ
White	–	250K ~ 300KΩ	–	∞	45K ~ 50KΩ
	–	130K ~ 140KΩ	–	∞	45K ~ 50KΩ
Green	–	600K ~ 1MΩ	70K ~ 110KΩ	–	7K ~ 9.5KΩ
	–	400K ~ 500KΩ	70K ~ 110KΩ	–	6.5K ~ 8.5KΩ
Brown	–	400K ~ 500KΩ	40K ~ 46KΩ	∞	–
	–	250K ~ 300KΩ	40K ~ 46KΩ	∞	–

*Upper lines are for the 220, 230, 240V specifications; lower lines for the 110, 120V specifications and the dual voltage type.

Table 9-1

MODEL RGD500, RGD500D

Tester polarity (+) \ (−)	Yellow	Red	White	Green	Brown
Yellow	∞	300K ~ 500KΩ	10K ~ 70KΩ	One wire: 0Ω Another: ∞	lead resistance existence
	∞	150K ~ 250KΩ	10K ~ 70KΩ	One wire: 0Ω Another: ∞	lead resistance existence
Red	∞	–	220K ~ 250KΩ	∞	300KΩ
	∞	–	110K ~ 125KΩ	∞	150KΩ
White	∞	220K ~ 250KΩ	–	∞	lead resistance
	∞	110K ~ 125KΩ	–	∞	existence
Green	∞	330K ~ 500KΩ	10K ~ 70KΩ	–	lead resistance
	∞	150K ~ 250KΩ	10K ~ 70KΩ	–	existence
Brown	∞	300K ~ 500KΩ	10K ~ 40KΩ	∞	–
	∞	150K ~ 250KΩ	10K ~ 40KΩ	∞	–

*Upper lines are for the 220, 230, 240V specifications; lower lines for the 110, 120V specifications and the dual voltage type.

*Lead resistance existence does not change so big in the amplitude degree of the hand when change the range of the tester.

Table 9-2

9-5 FUSE HOLDER and NO-FUSE HOLDER

9-5-1 NO-FUSE BREAKER

Turn the power switch off and check continuity. If no current flows, it is normal. Then turn the power switch on and check continuity again. If current flows, it is normal.

If the breaker is a two-pole type, the two pairs of terminals must carry current.

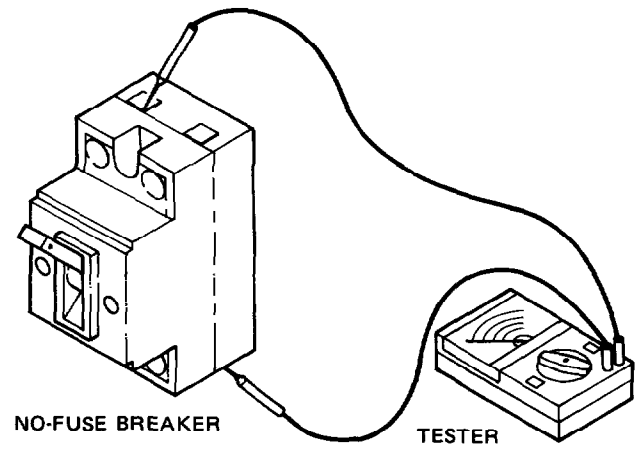


Fig. 9-6

9-5-2 FUSE HOLDER

Check that fuse is in the fuse holder and check its continuity with a tester. (See Fig. 9-7.) If it carries current, it is normal.

If there is no current, take the fuse out and check if for continuity. If the fuse carries current, the fuse holder is faulty. If the fuse carries no current, replace it with a fuse of the correct capacity, and check the fuse holder again for continuity.

Fuse capacity is 10A.

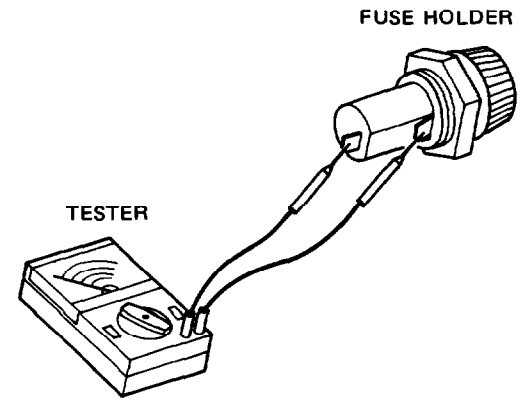


Fig. 9-7

9-6 RECEPTACLE and AC PLUG

Check the current-carrying parts of the receptacles and AC plugs and their leads and plastic parts for burns.

9-7 VOLTMETERS

Apply AC voltage to a terminal and check if the voltmeter reads normal.

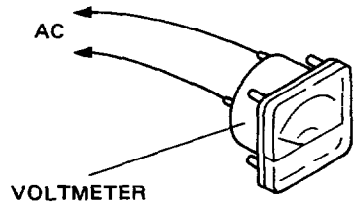


Fig. 9-8

9-8 DIODE STACK ASSEMBLY

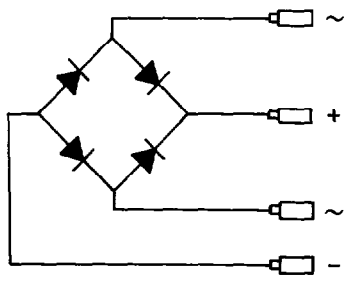


Fig. 9-9

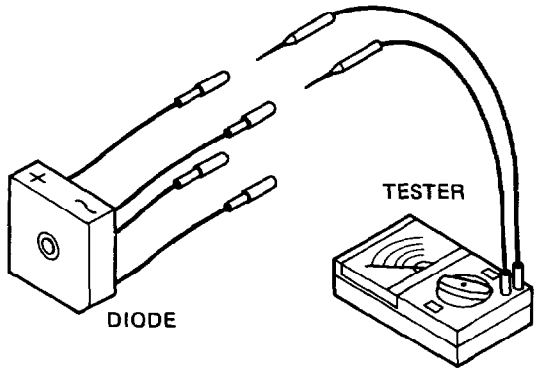


Fig. 9-10

The internal circuitry of the diode stack assembly is as shown in Fig. 9-9. Check inter-terminal continuity with a tester as shown in Fig. 9-10 to see that the results are as shown in Table 9-8.

TERMINAL	CURRENT	TERMINAL
~	⊖→ / ←✕	+
~	✕→ / ←⊖	−

Table 9-8

NOTE:

A ⊖→ B Current flows from A (+) to B (−).

C ✕→ D Current does not flow from C (+) to D (−).

~ Check both terminals.

9-9 PRIMARY EXCITING CIRCUIT

As described in **5-3 DESCRIPTION of GENERATOR OPERATION**, the primary exciting coil is in the magneto mounted on the engine, and the AVR has a circuit for it.

9-9-1 EXCITING COIL

The normal inter-terminal resistance of the exciting coil is about 2 to 3 ohms. Its voltage at the rated rpm is about AC 10 to 20V. Check the resistance and voltage with a tester to see if they meet these requirements.

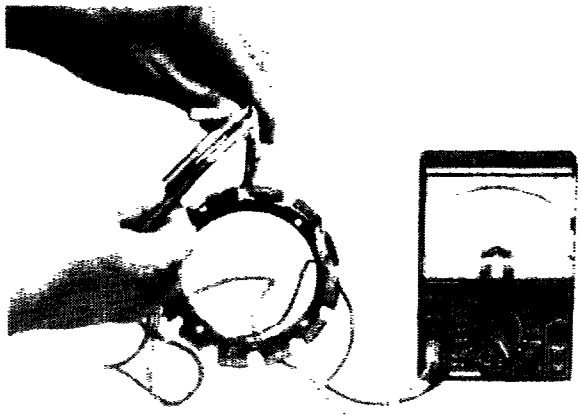


Fig. 9-11

9-9-2 OTHERS

No output voltage from the generator.

If the trouble cannot be detected by Step 9-9-1 above, check the primary exciting circuit as follows:

A. Disconnect the control box and operate the generator at the rated rpm. Disconnect the two yellow wires from the exciting coil to the AVR, and momentarily connect the positive (+) and negative (–) leads of a 12V battery in their place. If no output voltage is generated, reconnect the battery leads the other way. If output voltage is generated, the exciting coil is defective.

B. If no output voltage is generated by the test conducted as described in Step A., operate the generator at the rated rpm and momentarily connect a 12V battery to the brushes. The green lead is positive (+) and the black or brown lead negative (–). (See Fig. 9-12.) If output voltage is generated, the primary exciting circuit in the AVR is defective. Replace the AVR.

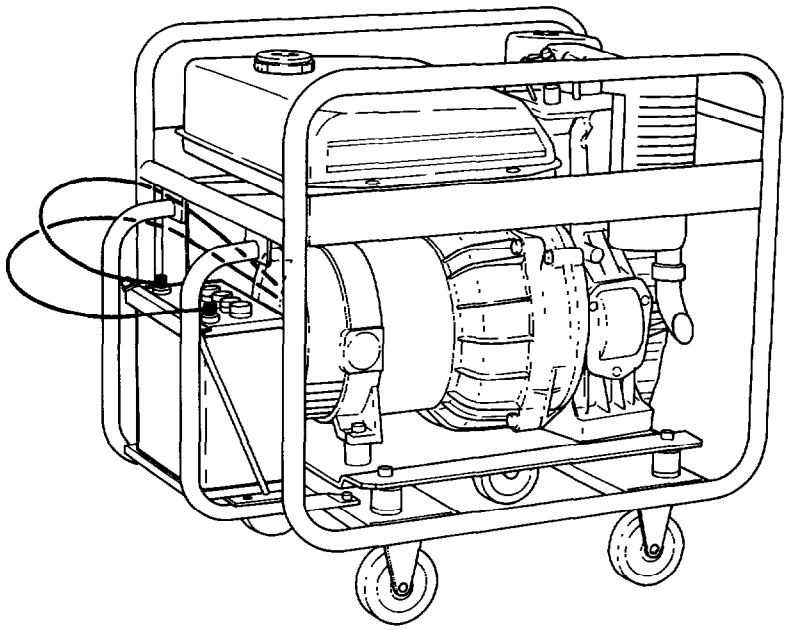


Fig. 9-12

10. DISASSEMBLY and REASSEMBLY

10-1 PREPARATIONS and SUGGESTIONS

1) When disassembling the engine, remember well the locations of individual parts so that they can be reassembled correctly. If you are uncertain of identifying some parts, it is suggested that tags be attached to them.
2) Have boxes ready to keep disassembled parts by group.
3) To prevent missing and misplacing, temporarily assemble each group of disassembed parts.
4) Use the correct tools in the correct way.

10-2 HOW TO DISASSEMBLE

Order	Item	Procedure	Remarks	Tool
1	Fuel Tank	(1) Discharge fuel from the tank. 1. Turn the fuel cock to OFF (S). 2. Disconnect the rubber pipe from the injection pump. (See Fig. 10-1.) 3. Turn the fuel cock to OPEN (O) to discharge the fuel.	Do not lose the gasket. Wipe off spilt fuel.	17 mm spanner
		(2) Disconnect the fuel pipe and return pipe from the tank bottom. (See Fig. 10-2.) 1. Remove the fuel pipe clamp and pull the fuel pipe off the tank. 2. Remove the banjo bolt that fastens the return pipe.	Do not lose the gasket.	Pliers 12 mm spanner
		(3) Remove the fuel tank. After removing the bolts, remove the fuel tank. (See Fig. 10-3.) 8 ϕ bolt . . . 4 pcs.		13 mm spanner or box spanner
		(4) Remove the fuel filter. 1. Remove the air vent pipe clamp, and pull out the pipe.(See Fig.10-4.) 2. Remove the fuel filter bolts and and the fuel filter.		Pliers 12 mm spanner or or box spanner

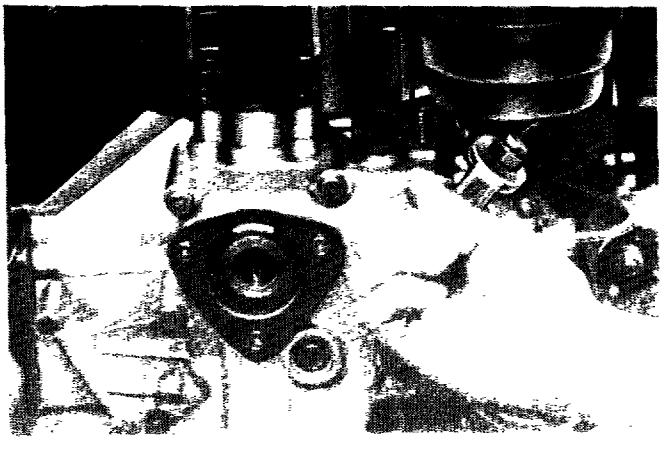


Fig. 10-1

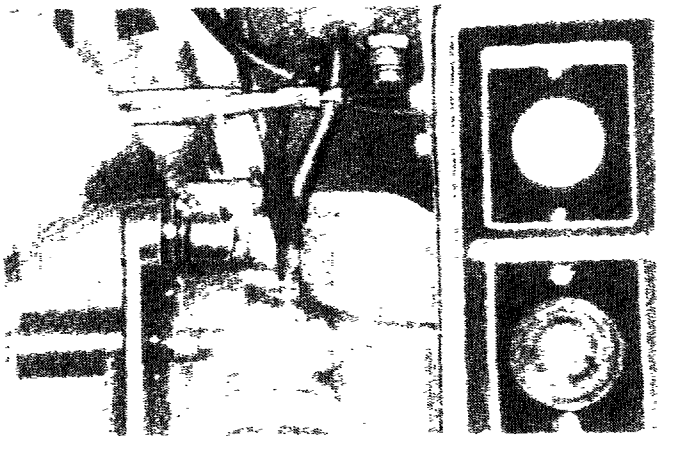


Fig. 10-2

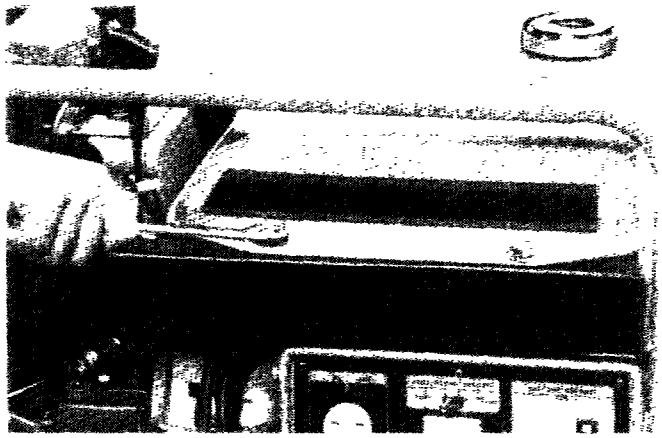


Fig. 10-3

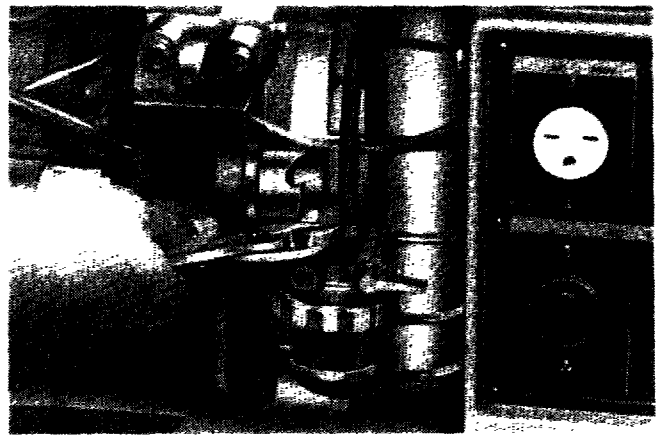


Fig. 10-4

Order	Item	Procedure	Remarks	Tool
2	Battery (Only electric starter type)	(1) Remove the battery cord. First, disconnect the negative end of the battery cord, and then the positive end of it.	Be careful not to short.	
		(2) Remove the battery. Remove the two nuts that fasten the battery, and take off the battery angle, battery bolts, and battery. 6ϕ nut . . 2 pcs.		10 mm spanner or box spanner
		(3) Remove the battery frame from the pipe frame.	It is not necessary to remove the battery base from the battery frame.	
		■**RGD351, RGD351D**		10 mm spanner or box spanner; 13 mm spanner

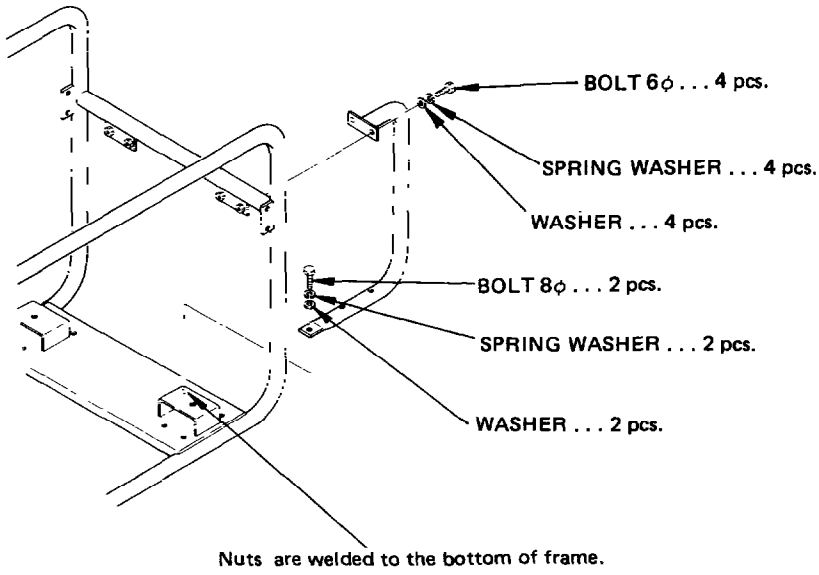

BOLT 6ϕ . . . 4 pcs.
SPRING WASHER . . . 4 pcs.
WASHER . . . 4 pcs.
BOLT 8ϕ . . . 2 pcs.
SPRING WASHER . . . 2 pcs.
WASHER . . . 2 pcs.
Nuts are welded to the bottom of frame.

Fig. 10-5

Order	Item	Procedure	Remarks	Tool
		■RGD500, RGD500D		10 mm spanner or box spanner; 13 mm spanner

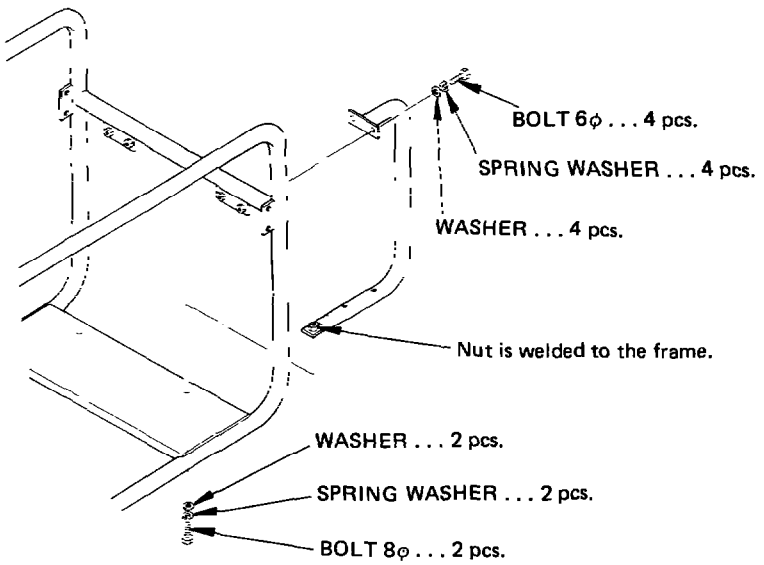


Fig. 10-6

3	Control Box	*RGD351, RGD351D (1) Disengage all connectors from the rear of the control box.	The connectors are a lock type so push and pull out as shown in Fig. 10-7.	

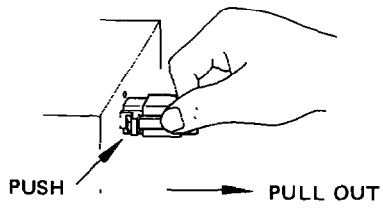


Fig. 10-7

		(2) Remove the guide that binds the control box top to side frame. (See Fig. 10-8.) 5φ bolt . . . 2 pcs.		8 mm spanner or box spanner

Order	Item	Procedure	Remarks	Tool
		(3) Remove the control box from the frame. 1. Place a spacer under the control box end of the frame, and raise the frame aslant. (See Fig. 10-9.) 2. Remove the three bolts and rubber mounts from the frame under the control box. 8ϕ bolt . . . 3 pcs. 3. Pull out the control box, and remove the clamp that fastens the exciting coil leads on the back panel.	Rubber mounts can be removed by turning. If castors are provided, remove the four castor mounting bolts.	13 mm spanner
		4. If castors are provided, remove all castors by lifting the frame or placing a spacer under the frame. 5. Completely pull out the control box.		13 mm spanner or box spanner . . . 2 pcs.

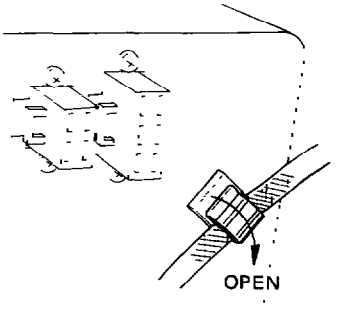


Fig. 10-10

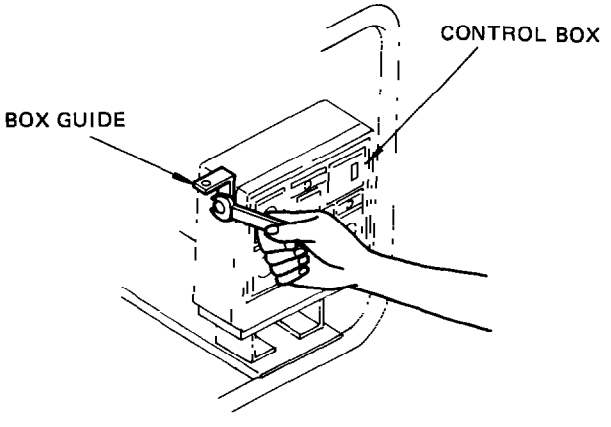


Fig. 10-8

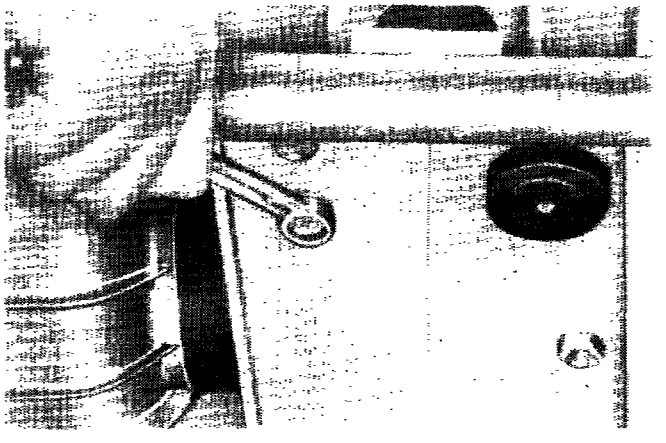
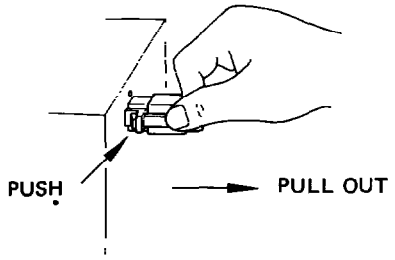
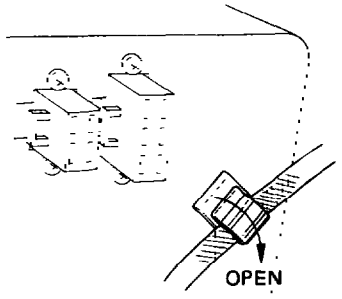


Fig. 10-9

Order	Item	Procedure	Remarks	Tool
3	Control Box	*RGD500, RGD500D (1) Disengage all connectors from the rear of the control box. (See Fig. 10-11.)  *Fig. 10-11*	The connectors are a lock type so push and pull as shown in Fig. 10-11.	
		(2) Remove the control box from the frame. 1. Remove the bolts from the control box side. (See Fig. 10-13.) 6ϕ bolt . . . 4 pcs. 2. Pull out the control box, and remove the clamp that fastens the exciting leads on the back panel. (See Fig. 10-12.)  *Fig. 10-12* 3. Completely pull out the control box.		10 mm spanner or box spanner

On page 45 and in the Order 2, it is mentioned that the battery be removed. However, in case of the control box being faulty and/or in the case of only checking the brush, it is unnecessary to remove the battery in advance for taking out the control box.

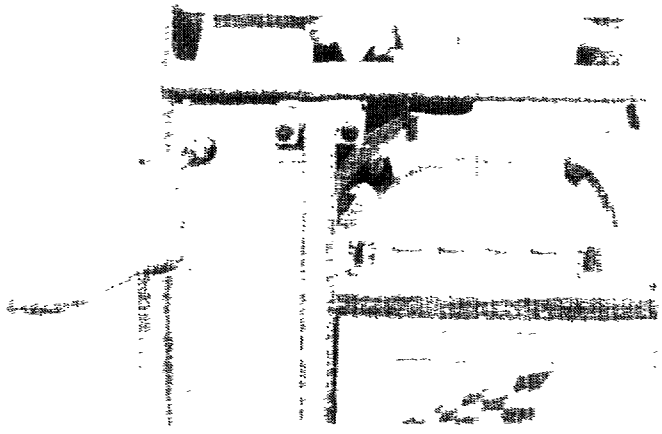
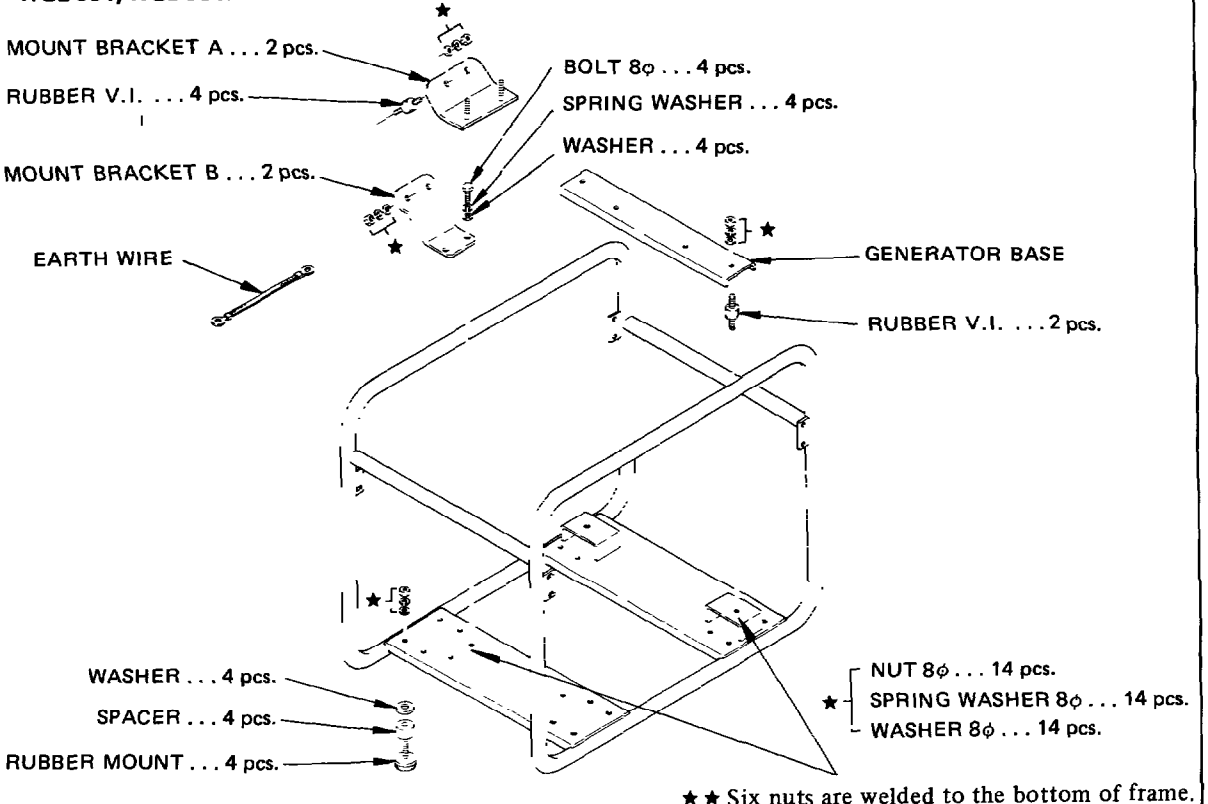


Fig. 10-13

Order	Item	Procedure	Remarks	Tool
4	Pipe Frame	(1) Remove side plates A and B. 6φ bolt . . . 8 pcs.	Black coated bolts are used.	10 mm spanner or box spanner
		(2) Remove the nuts and bolts that fasten the generator and frame together.		
		*RGD351, RGD351D 1. Remove the nuts that fasten the bottom of engine to mount bracket A. (See Fig. 10-15.) Remove the earth wire from bolt. 8φ nut . . . 4 pcs.	Bolts are welded to mount bracket.	13 mm spanner or box spanner
		2. Remove the bolts that fasten the bottom of generator to the generator base. 8φ nut . . . 2 pcs.	Nuts are welded to the generator base.	13 mm spanner or box spanner
		*RGD500, RGD500D Remove the bolts that fasten the engine and generator to the base. 8φ bolt . . . 6 pcs.	Nuts are welded to the bottom of base.	13 mm spanner or box spanner
		(3) Lift the generator with a chain block and remove it from the frame. (See Fig. 10-16.)	Be careful to keep the belt in place and gen-	
		(4) Remove the rubber mounts and castors from the frame.		

■**RGD351, RGD351D**


MOUNT BRACKET A . . . 2 pcs.
RUBBER V.I. . . . 4 pcs.
MOUNT BRACKET B . . . 2 pcs.
EARTH WIRE
BOLT 8φ . . . 4 pcs.
SPRING WASHER . . . 4 pcs.
WASHER . . . 4 pcs.
GENERATOR BASE
RUBBER V.I. . . . 2 pcs.
WASHER . . . 4 pcs.
SPACER . . . 4 pcs.
RUBBER MOUNT . . . 4 pcs.
NUT 8φ . . . 14 pcs.
SPRING WASHER 8φ . . . 14 pcs.
WASHER 8φ . . . 14 pcs.

★★ Six nuts are welded to the bottom of frame.

Fig. 10-14

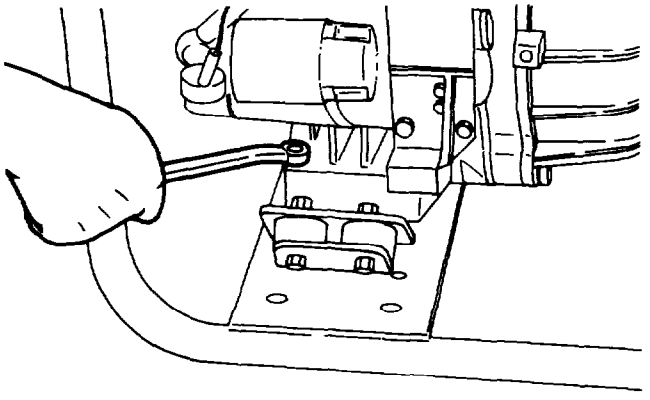


Fig. 10-15

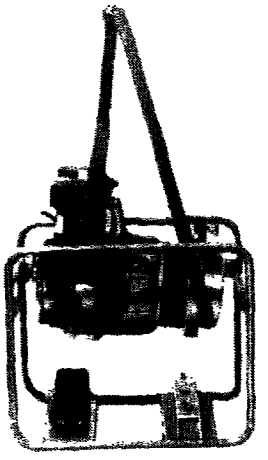
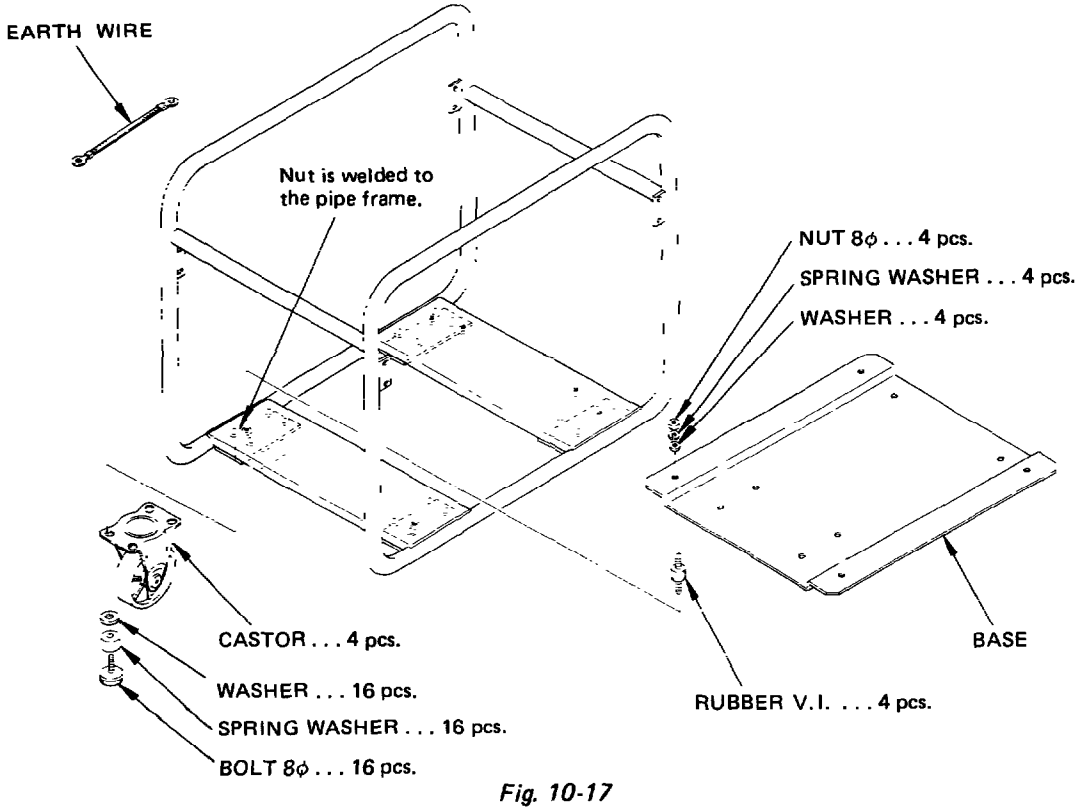


Fig. 10-16

Order	Item	Procedure	Remarks	Tool
	■RGD500, RGD500D  *Fig. 10-17*			
5	Brush Holder	(1) Remove the brush cover from the rear cover.		(+) driver
		(2) Disconnect the terminal wires from the brush holder, and remove the brush holder. (See Fig. 10-18.) 5φ screw . . . 2 pcs.	If rear cover is removed from the generator without removing the brush holder, the brush will break. Be sure to remove the brush holder.	(+) driver

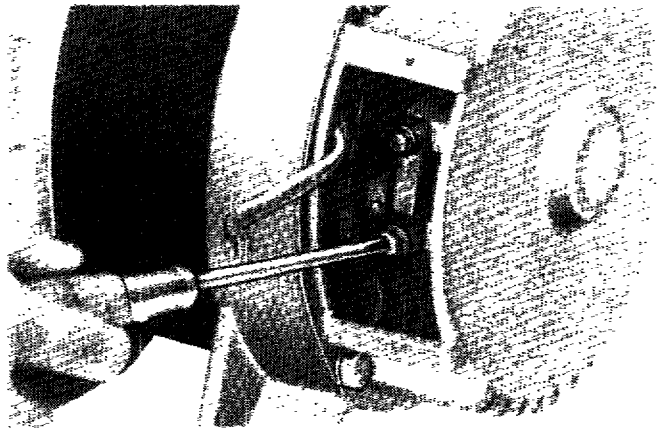


Fig. 10-18

Fig. 10-19

Order	Item	Procedure	Remarks	Tool
6	Rear Cover	(1) Loosen and remove the cover bolts. 8ϕ bolt . . . 4 pcs.		13 mm spanner or box spanner
		(2) Turn up the stator cover edge and up remove the stator cover.		Screwdriver
		(3) Remove the rear cover. (See Fig. 10-19.) Remove the rear cover by evenly and lightly tapping it with a plastic hammer.	As the connector cannot be pulled out through rear cover or grommet, stator and rear cover cannot be completely separated. Simply disengage rear cover from rotor bearing.	Plastic hammer
7	Stator	(1) Remove the stator from the adaptor. Lightly strike the outside of the stator core with a plastic hammer. (See Fig. 10-20.)	Never strike the coil and leads. Be careful not to peel the stator steel plate.	Plastic hammer and screwdriver
		(2) Separate the stator and rear cover. Disengage the connector and wire. Remove the terminal catch in the connector by pushing it with something pointed like a needle, and pull out the terminal. (See Fig. 10-21.)	It is not necessary to separate the stator and rear cover except when replacing the stator, rear cover, or diode stack.	
		(3) Pull out the wire from the grommet and rear cover.		

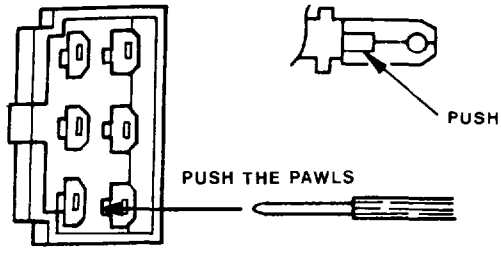


Fig. 10-21

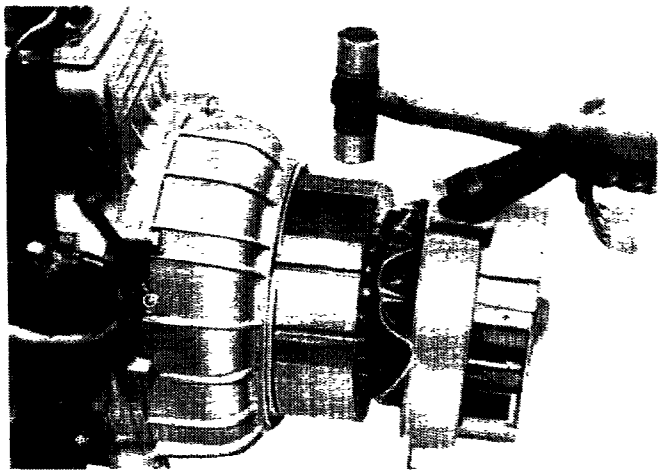


Fig. 10-20

Order	Item	Procedure	Remarks	Tool
8	Rotor	(1) Remove the through-bolt. Hold the through-bolt with box spanner or socket wrench, strike it hard with hammer counterclockwise to loosen, and remove the bolt. (See Fig. 10-22.) Bolt . . . 1 pce.		Hammer, box spanner or socket wrench
		(2) Remove the rotor. Lightly strike the rotor core with plastic hammer, and pull out the rotor from the tapered shaft of the engine. If the rotor cannot be taken off, strike it at different angles. (See Fig. 10-23.)	Never strike the slip ring and coil.	
9	Adaptor and Driving Shaft	(1) Remove the four adaptor mounting bolts, and the adaptor. 8ϕ bolt . . . 4 pcs.		12 mm spanner
		(2) Remove the four driving shaft mounting bolts, and the driving shaft. 10ϕ bolt . . . 4 pcs.		14 mm spanner

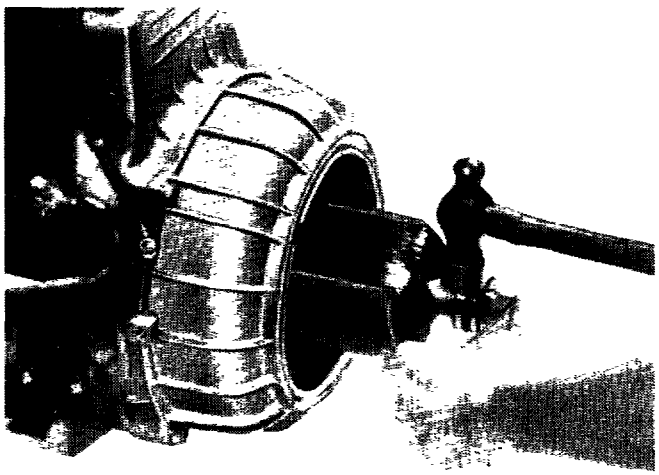


Fig. 10-22

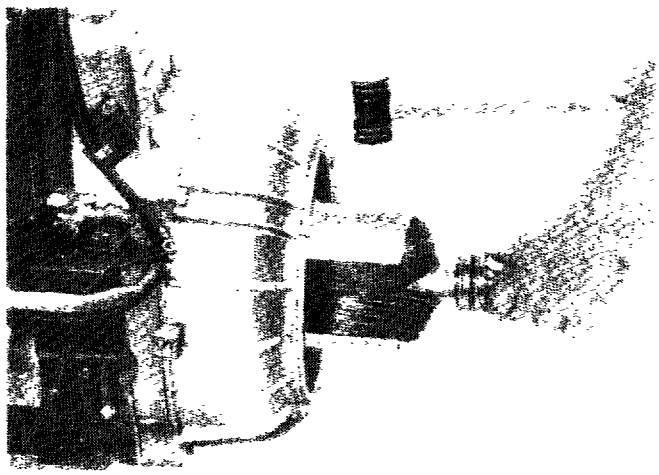


Fig. 10-23

10-3 HOW TO REASSEMBLE

10-3-1 DRIVING SHAFT and ADAPTOR

1) Align the driving shaft with the faucet joint of the flywheel and install it.

10ϕ x 30 mm bolt	4 pcs.
10ϕ spring washer	4 pcs.
Tightening torque	550 to 700 kg-cm

2) Install the adaptor in the blower housing, making sure that its flat side is down and its fuel filter mounting boss on the air cleaner side.

8ϕ x 25 mm bolt	4 pcs.
8ϕ spring washer	4 pcs.
Tightening torque	200 to 230 kg-cm

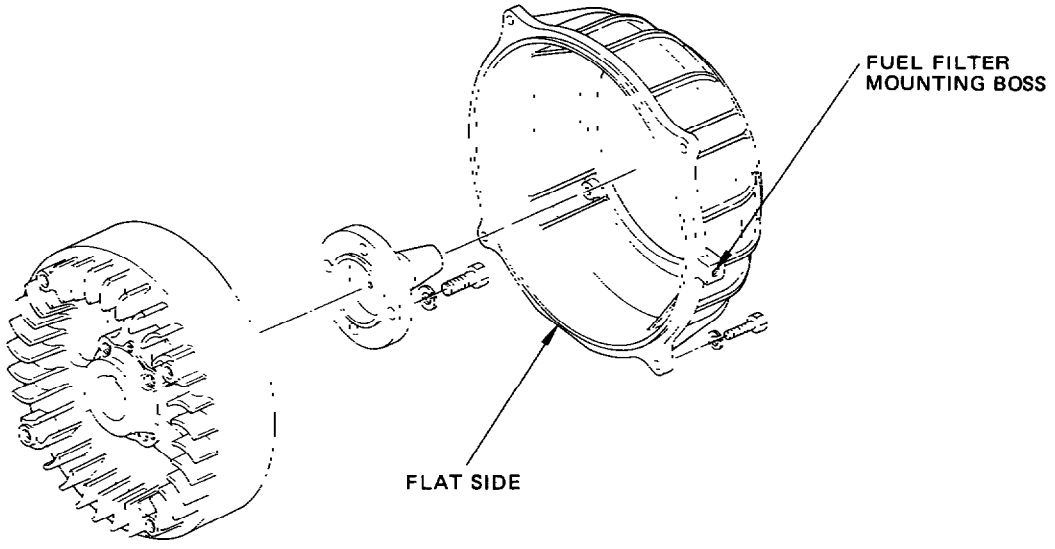


Fig. 10-24

10-3-2 ROTOR

1) Clean the tapered part of the driving shaft and the matching tapered part of the rotor shaft of oil and dirt with a waste cloth.
2) Install the rotor and tighten the through-bolt. (See Fig. 10-25.)
   Tighten the through-bolt by striking the box spanner or socket wrench hard with a hammer clockwise.

NOTE: If you have an impact wrench, use it.

NOTE: The rotor outside diameter and layer thickness are shown in 5-2-2 ROTOR.
The RGD Series has no fan for the rotor.

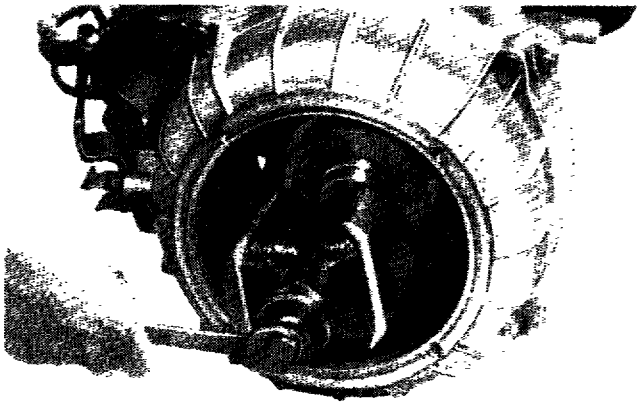
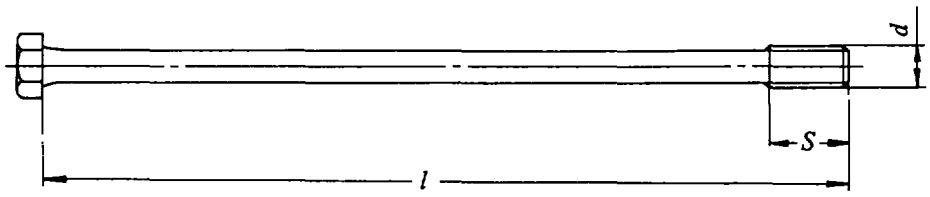


Fig. 10-25

NOTE: The shape of the through-bolt is shown below



Model		*l*	*s*	*d*
RGD351	(mm)	180	30	10
RGD351D	(inch)	7.09	1.18	0.39
RGD500	(mm)	210	30	10
RGD500D	(inch)	8.27	1.18	0.39

Table 10-1

10-3-3 STATOR

Install the stator in such a way that it matches the faucet joint of the front cover. If it is difficult to install in place, gently strike the stator core with a plastic hammer as shown in Fig. 10-26.

NOTE: Never strike the coils.

NOTE: Make sure that the control box leads are up, the brush leads are out from the control box side, and the leads to the diode out to the opposite side as shown in Fig. 10-27.

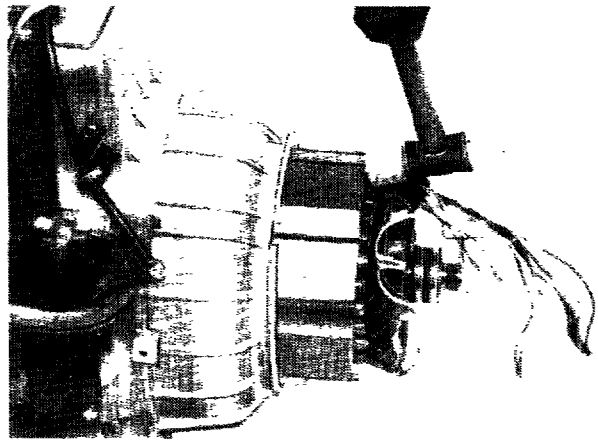


Fig. 10-26

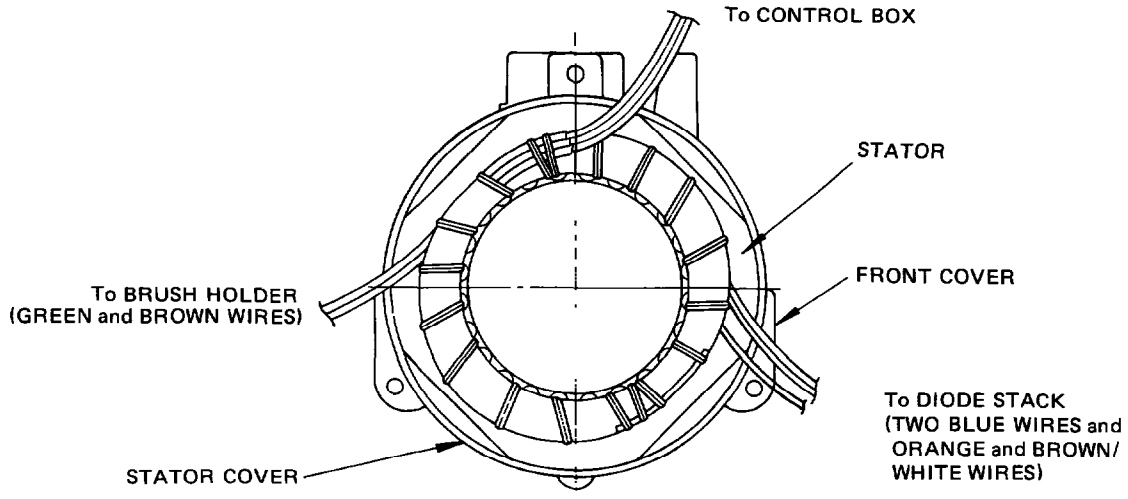


Fig. 10-27

10-3-4 REAR COVER

1) Install the diode stack in the rear cover.

   4ϕ x 18 mm screw ..... 1 pce.

2) Connect the stator wires to diode stack.

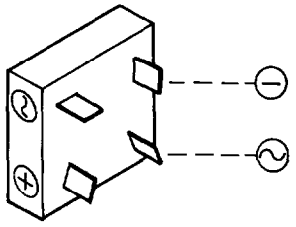


Fig. 10-28

The diode stack has markings as shown in Fig. 10-28.
Connect the two blue wires to the points marked ⊖ .
Connect the orange wire to the point marked ⊕ .
Connect the brown wire to the point marked ⊖ .

3) Pass all the wires from the stator to the control box through hole in the top of the rear cover.

4) Install the rear cover so that it matches the rotor bearing. Gently strike the edge of the rear cover evenly all around with a plastic hammer. (See Fig. 10-29.)
   NOTE: Be careful not to let the wires get caught between the stator and rear cover.

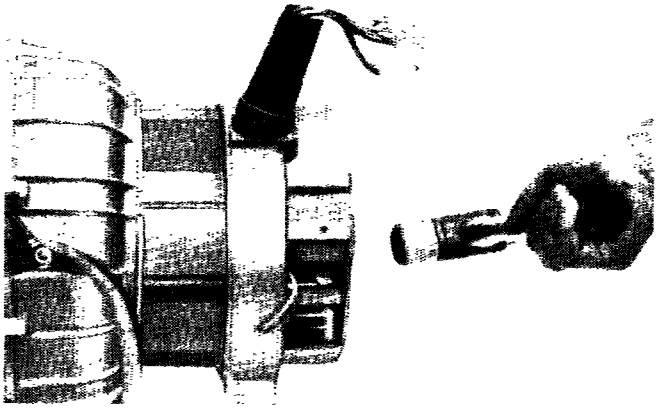
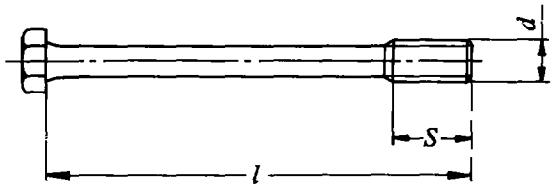


Fig. 10-29

5) Tighten the cover bolt.
   NOTE: The front cover and rear cover must be in the correct position to be installed. The cover bolt is shaped as shown below.



Model		*l*	*s*	*d*
RGD351	(mm)	130	30	8
RGD351D	(mm)	5.12	1.18	0.31
RGD500	(mm)	155	30	8
RGD500D	(inch)	6.10	1.18	0.31

Table 10-2

6) Install the stator cover.
Make sure that all the cover bolts are covered by the stator cover, and fold back the stator cover edge.

7) Pass the wires from the top of the rear cover through the grommet, and fit the grommet into the hole in the rear cover.

8) Insert the wires into the connectors.
The connector positions and wire colors are shown in Table 10-3.

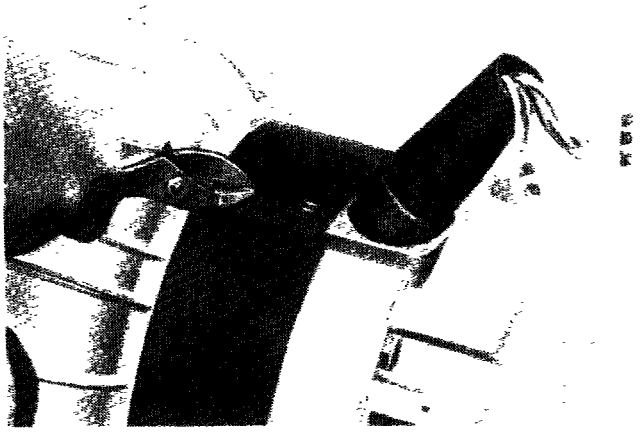
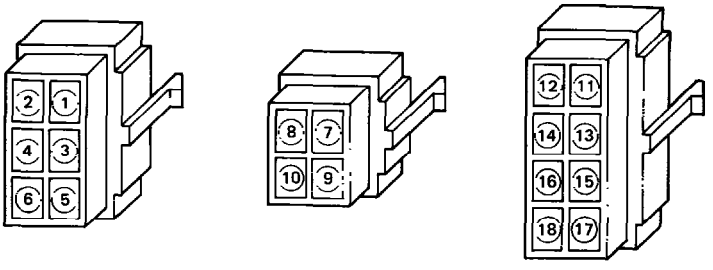


Fig. 10-30



SPEC.		①	②	③	④	⑤	⑥	⑦	⑧	⑨
Hand start	220, 230, 240V	YELLOW	YELLOW	GREEN	BROWN	ORANGE	BROWN / WHITE	RED	WHITE	—
	D type, 110, 120V	YELLOW	YELLOW	GREEN	BROWN	ORANGE	BROWN / WHITE	RED	WHITE	BLACK
Electric start	220, 230, 240V	—	—	GREEN	BROWN	ORANGE	BROWN / WHITE	RED	WHITE	—
	D type, 110, 120V	—	—	GREEN	BROWN	ORANGE	BROWN / WHITE	RED	WHITE	BLACK

SPEC.		⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱
Hand start	220, 230, 240V	—	—	—	—	—	—	—	—	—
	D type, 110, 120V	YELLOW	—	—	—	—	—	—	—	—
Electric start	220, 230, 240V	—	YELLOW	YEELOW	—	—	GRAY	PINK	(WHITE)	—
	D type, 110, 120V	YELLOW	YELLOW	YELLOW	—	—	GRAY	PINK	(WHITE)	—

Table 10-3

NOTES:

1) Wire sizes are as follows:

⑴ ~ ⑷, ⑪ ~ ⑱ ..... *0.75 mm²*
⑸, ⑹ ..... *1.25 mm²*
⑺ ~ ⑽ ..... *2 mm²*

2) White wire ⑰ has not been used since March, 1983, when it was replaced by body grounding.

10-3-5 BRUSH HOLDER

1) Install the brush holder in the rear cover.
   Pass the screws for tightening the brush holder, push it so the brush will be perpendicular to the slip ring, and tighten the screws. (See Fig. 10-31.)
   5ϕ x 18 mm screw . . . . . 2 pcs.
   NOTE: The direction of installing the brush holder is shown in Fig. 10-32.

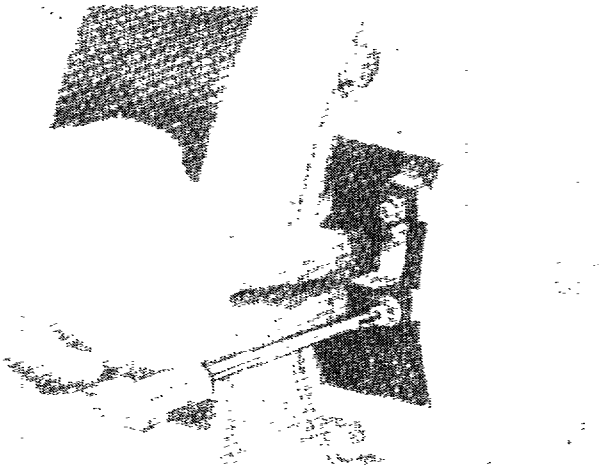


Fig. 10-31

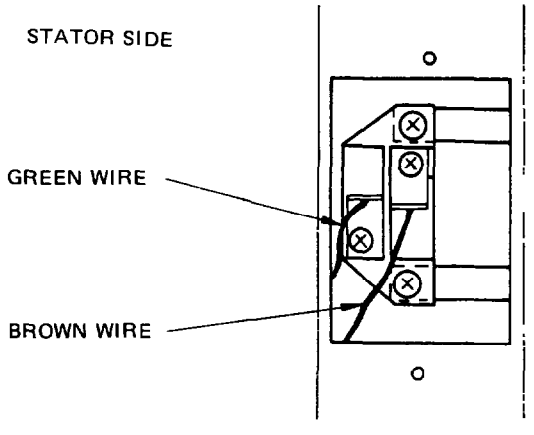


Fig. 10-32

NOTE: If the brush is placed aslant, the brush holder may break under screw pressure, or the brush may break when the engine is started. After installing the brush holder, measure the brush terminal resistance with a tester. The brush is properly installed if the terminal resistance is anywhere about 5 to 10.5 ohms.

2) Connect the wires to the brush holder.
   Connect the green wire to the stator side and the brown wire to the bearing side of the brush holder. (See Fig. 10-32.)
3) Install the brush cover.
   5ϕ x 10 mm screw . . . . . 2 pcs.

10-3-6 FRAME

■RGD351, RGD351D

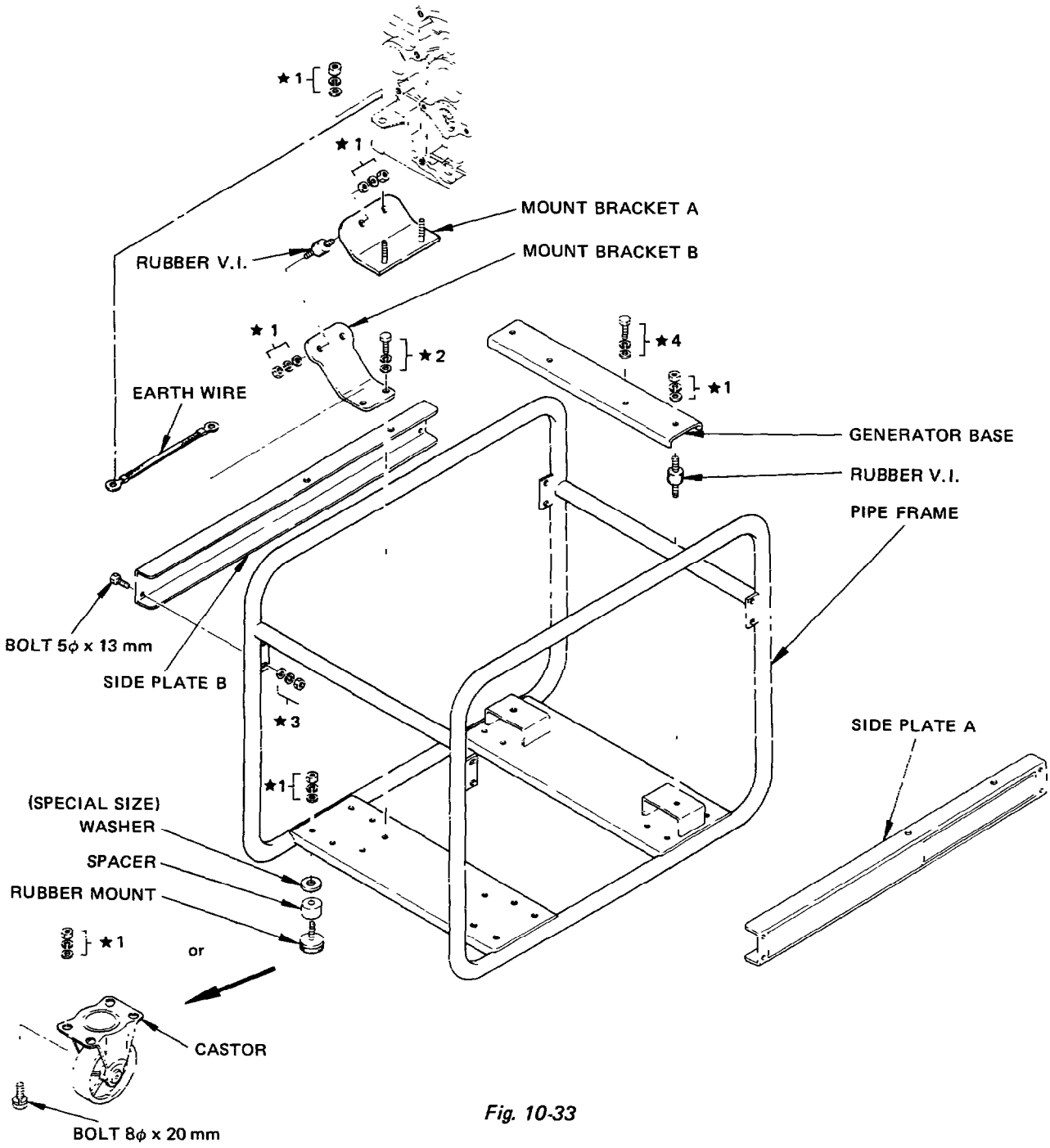


Fig. 10-33

★1 NUT 8φ, SPRING WASHER 8φ, WASHER 8φ

★2 BOLT 8φ x 20 mm, SPRING WASHER 8φ, WASHER 8φ

★3 NUT 6φ, SPRING WASHER 6φ, WASHER 6φ

★4 BOLT 8φ x 25 mm, SPRING WASHER 8φ, WASHER 8φ (Special size)

1) Attach two mount brackets Bs to the pipe frame. (See Fig. 10-33.)
Tighten the earth wire together with the mount bracket bolt that is farthest from the control box.

8φ x 20 mm bolt ..... 4 pcs.
8φ spring washer ..... 4 pcs.
8φ washer ..... 4 pcs.

2) Install the four rubber vibration isolators on the two mount brackets Bs.

8φ nut ..... 4 pcs.
8φ spring washer ..... 4 pcs.
8φ washer ..... 4 pcs.

3) Install two mount brackets As on the rubber vibration isolators that were installed in Step 2).

8φ nut ..... 4 pcs.
8φ spring washer ..... 4 pcs.
8φ washer ..... 4 pcs.

4) Attach two rubber vibration isolators to the bottom of the pipe frame under the generator, and install the generator base on it.
The pipe frame has nuts welded to it so turn the rubber vibration isolators into them.
The direction of mounting the generator base is shown
in Fig. 10-34.

8φ nut ..... 2 pcs.
8φ spring washer ..... 2 pcs.
8φ washer ..... 2 pcs.

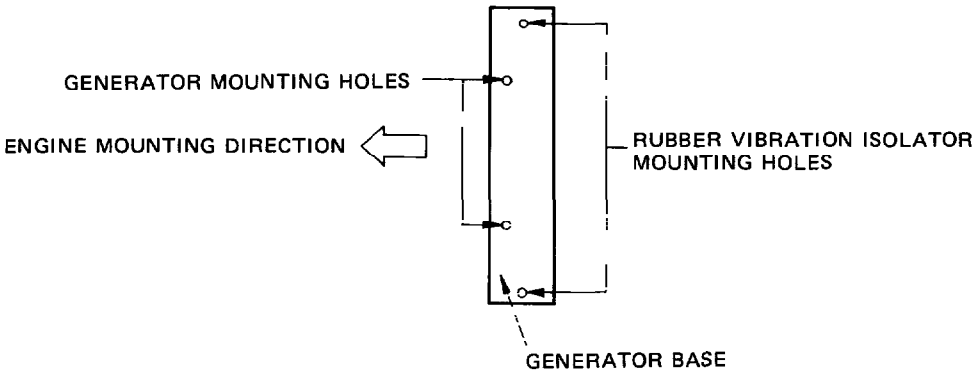


Fig. 10-34

5) Install the engine and generator assembly in the pipe frame.

a. Lift the engine and generator assembly with a chain block, and lower it, making sure that it is in line with the bolts welded to mount bracket A.

b. After lowering the assembly to position, tighten the engine end with four nuts and the generator end with two bolts. In this case, tighten one of the earth wires together with the bolt welded farthest from the generator under the engine muffler (opposite to the fuel filter).

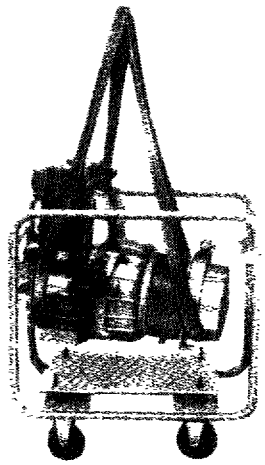


Fig. 10-35

Engine side	8φ nut	4 pcs.
	8φ spring washer	4 pcs.
	8φ washer	4 pcs.
	8φ x 25 mm bolt	2 pcs.
Generator side	8φ spring washer	2 pcs.
	8φ washer (special size)	2 pcs.

After tightening the assembly, lower the chain block all the way, and remove the belt. After removing the belt, check the bolts and nuts again that they are securely tightened.

NOTE: Be careful of maintaining engine balance when lifting the assembly with the chain block.

6) Fasten side plates A and B to the pipe frame.

Attach the nameplate that shows the product name Robin Generator and its model name to the front (the control box side) of the pipe frame and the blank plate to the rear.

Use the black bolts.

6φ x 13 mm bolt (black)	8 pcs.
6φ spring washer	8 pcs.
6φ washer	8 pcs.
6φ nut	8 pcs.

■RGD500, RGD500D

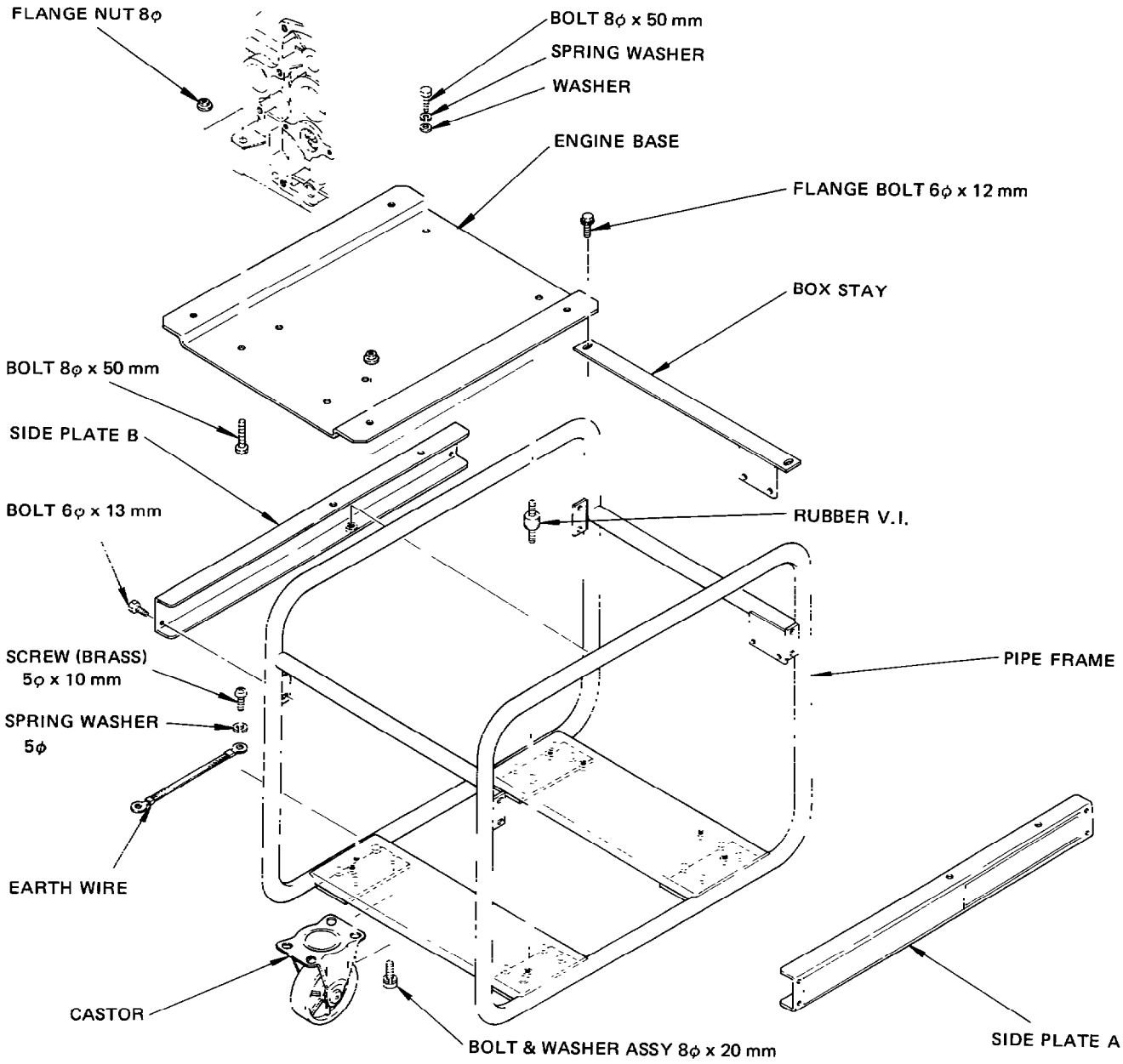


Fig. 10-36

1) Install the castors under the pipe frame.

The castors are of rubber, measuring 100 mm in diameter. None of the four castors swivel. The pipe frame has nuts welded to it. Use bolts with spring washer and washer.

8φ x 20 mm bolt and washer assembly . . . . . 16 sets

2) Fasten the earth wire.

Fasten the earth wire to the pipe frame at the point shown in Fig. 10-36. Use a brass screw for this purpose.

5φ x 10 mm screw . . . . . 1 pce.

5φ spring washer . . . . . 1 pce.

3) Install the rubber vibration isolators.

Fasten four rubber vibration isolators to the pipe frame. The pipe frame has nuts welded to it so turn the rubber vibration isolators in.

4) Install the engine base.

a. Tighten four bolts in the tapped holes in the engine base where the engine is to be installed.

8ϕ x 50 mm bolt ..... 4 pcs.

b. Install the engine base on the rubber vibration isolators attached to the pipe frame, and tighten it with flange nuts.

8ϕ nut ..... 4 pcs.

5) Install the engine and generator assembly in the pipe frame.

a. Lift the engine and generator assembly with a chain block, and lower it, making sure that the bolts fasten in Step 4) a. and fit to the engine base mounting holes.

NOTE: Be careful of maintaining balance.

b. Place two spacers under each side of the generator so that it is level with the engine.

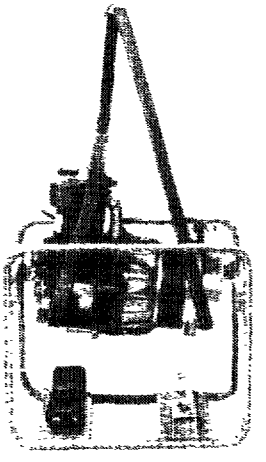


Fig. 10-37

c. Align the holes in the generator base and spacers with those in the engine base, and lightly tighten the bolts from above. Then, lower the chain block all the way, and remove the belt from the chain block. Tighten the generator base bolts. Nuts are welded to the bottom of the engine base.

8ϕ x 50 mm bolt ..... 2 pcs.
8ϕ spring ..... 2 pcs.
8ϕ washer (special size) ..... 2 pcs.

d. Tighten flange nuts on the bolts under the engine.

8ϕ flange nut ..... 4 pcs.

6) Install side plate A and B and box stay

a. Attach the nameplate that shows the product name Robin Generator and its model name to the front (control side) and the blank plate to the rear.

Use black bolts for this purpose. The pipe frame has nuts welded to it.

6ϕ x 13 mm bolt (black) ..... 8 pcs.

b. Fasten the box stay to the side plates. The stay for mounting the control box should be up front. (See Fig. 10-36.) The side plates have nuts welded to them.

6ϕ x 12 mm flange nut ..... 2 pcs.

10-3-7 CONTROL BOX

Install the control box as a subassembly in the frame. The subassembly procedure is described in **10-4 CONTROL BOX CHECK, DISASSEMBLY and REASSEMBLY.**

*The RGD351 and RGD351D differ in the way of installing the control box depending on whether they are fitted with optional castors.

■ Standard (without castors)

1) Lift the pipe frame with a chain block, fasten only one rubber mount to the front right hole in the control box, and tighten the other three points with bolts. A spacer and washer must be placed between the rubber mount and pipe frame. The box base has nuts welded to it. (See Fig. 10-38.)

   8φ x 20 mm bolt . . . . . 2 pcs.
   8φ spring washer . . . . . 2 pcs.
   8φ washer . . . . . 2 pcs.
   8φ washer (special size) . . . . . 1 pce.

2) Fasten rubber mounts to the remaining three points of the pipe frame. A spacer and washer must be placed between the pipe frame and each rubber mount. (See Fig. 10-33.)

   8φ washer (special size) . . . . . 3 pcs.
   8φ nut . . . . . 3 pcs.
   8φ spring washer . . . . . 3 pcs.
   8φ washer . . . . . 3 pcs.

3) Lower the generator, remove the chain block, and fasten the box guide to the side of the control box and side plate A. Nuts are welded to the inside of the control box and the side plate.

   5φ x 15 mm bolt . . . . . 2 pcs.
   5φ spring washer . . . . . 2 pcs.
   5φ washer . . . . . 2 pcs.

4) Connect the coupler on the rear of the control box. Push in the coupler all the way until it is locked. (See Fig. 10-40.)

5) Fasten the exciter coil wire with the clamp on the back of the control box. (See Fig. 10-41.)

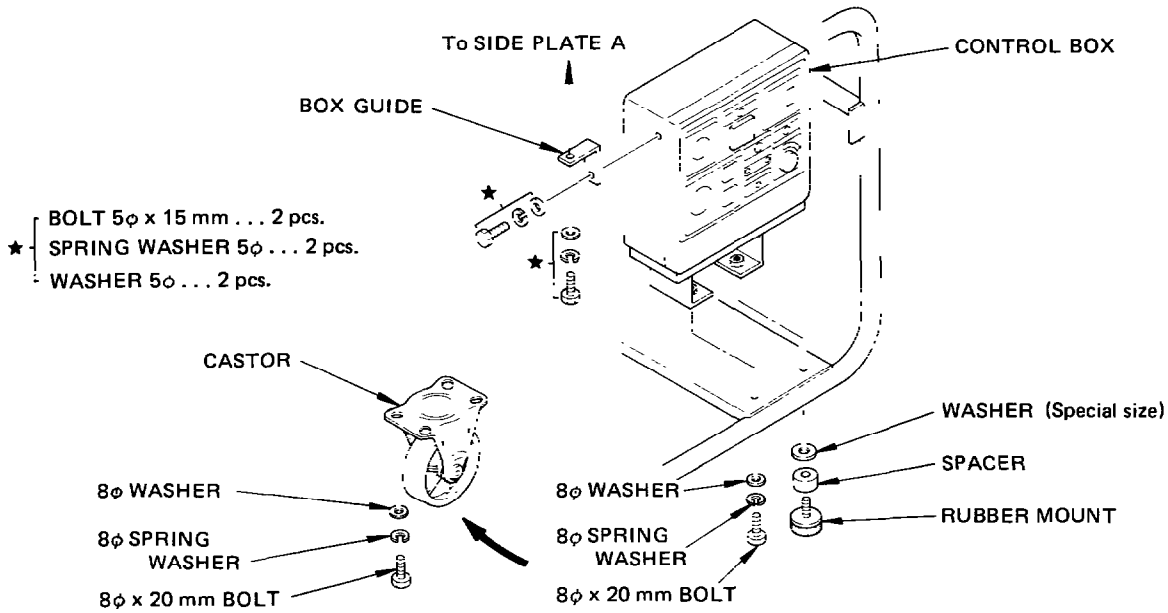


Fig. 10-38

■Model with castors

1) Lift the pipe frame with a chain block, install the control box on the frame and a castor on the underside of the frame, and tighten them together with the bolts. (See Fig. 10-38.)

8φ x 20 mm bolt	4 pcs.
8φ spring washer	4 pcs.
8φ washer	4 pcs.

2) Install the remaining three castors on the underside of the pipe frame. (See Fig. 10-38.)

8φ x 20 mm bolt	12 pcs.
8φ nut	12 pcs.
8φ spring washer	12 pcs.
8φ washer	12 pcs.

3) Lower the chain block, remove the chain block, and install the box guide on the control box side and side plate A. Nuts are welded to the inside of the control box and the side plate.

5φ x 15 mm bolt	2 pcs.
5φ spring washer	2 pcs.
5φ washer	2 pcs.

4) Connect the coupler on the rear of the control box. Push in the coupler all the way until it is locked. (See Fig. 10-40.)

5) Fasten the exciting coil wire with the clamp on the back of the control box. (See Fig. 10-41.)

*RGD500, RGD500D

1) Fasten the control box to the frame and box stay.
Nuts are welded to the inside of the control box. (See Fig. 10-39.)
Use lock washers.

6φ x 15 mm bolt	4 pcs.
6φ lock washer	4 pcs.

2) Connect the coupler on the rear of the control box. Push in the coupler all the way until it is locked. (See Fig. 10-40.)

3) Fasten the exciter coil with the clamp on the back of the control box. (See Fig. 10-41.)

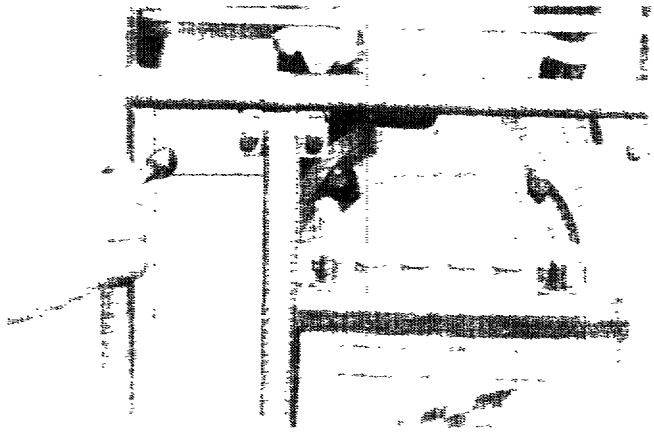


Fig. 10-39

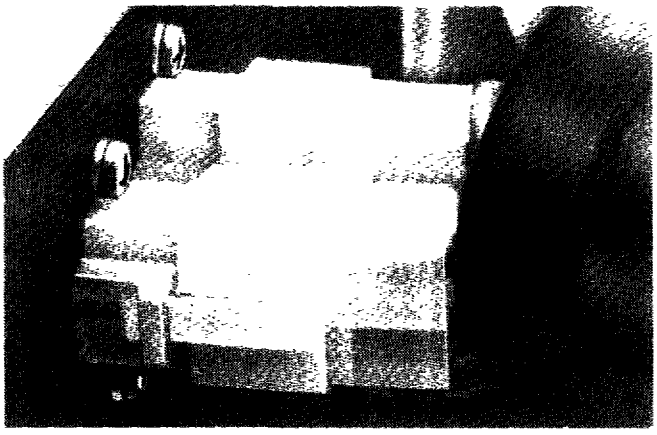


Fig. 10-40

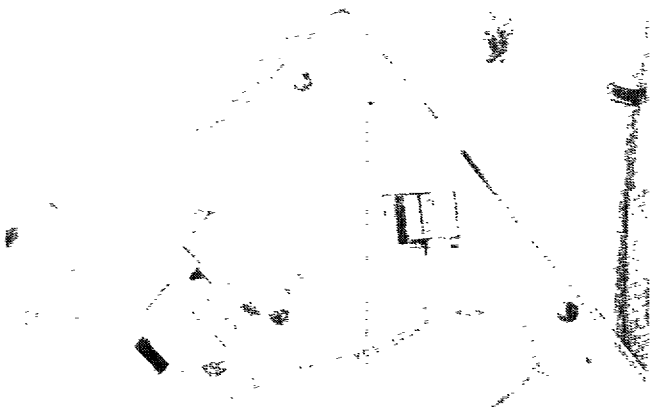


Fig. 10-41

10-3-8 FUEL TANK

1) Connect fuel pipe 5 complete and rubber pipe (6 mm inside diameter, 12 mm outside diameter, 160 mm long) to the fuel tank.
   a. Connect the rubber pipe and fasten it with the hose clamp (10.5 mm inside diameter).
   b. Connect fuel pipe 5 complete to both ends of the banjo and tighten it with gaskets (aluminum) and banjo bolts.

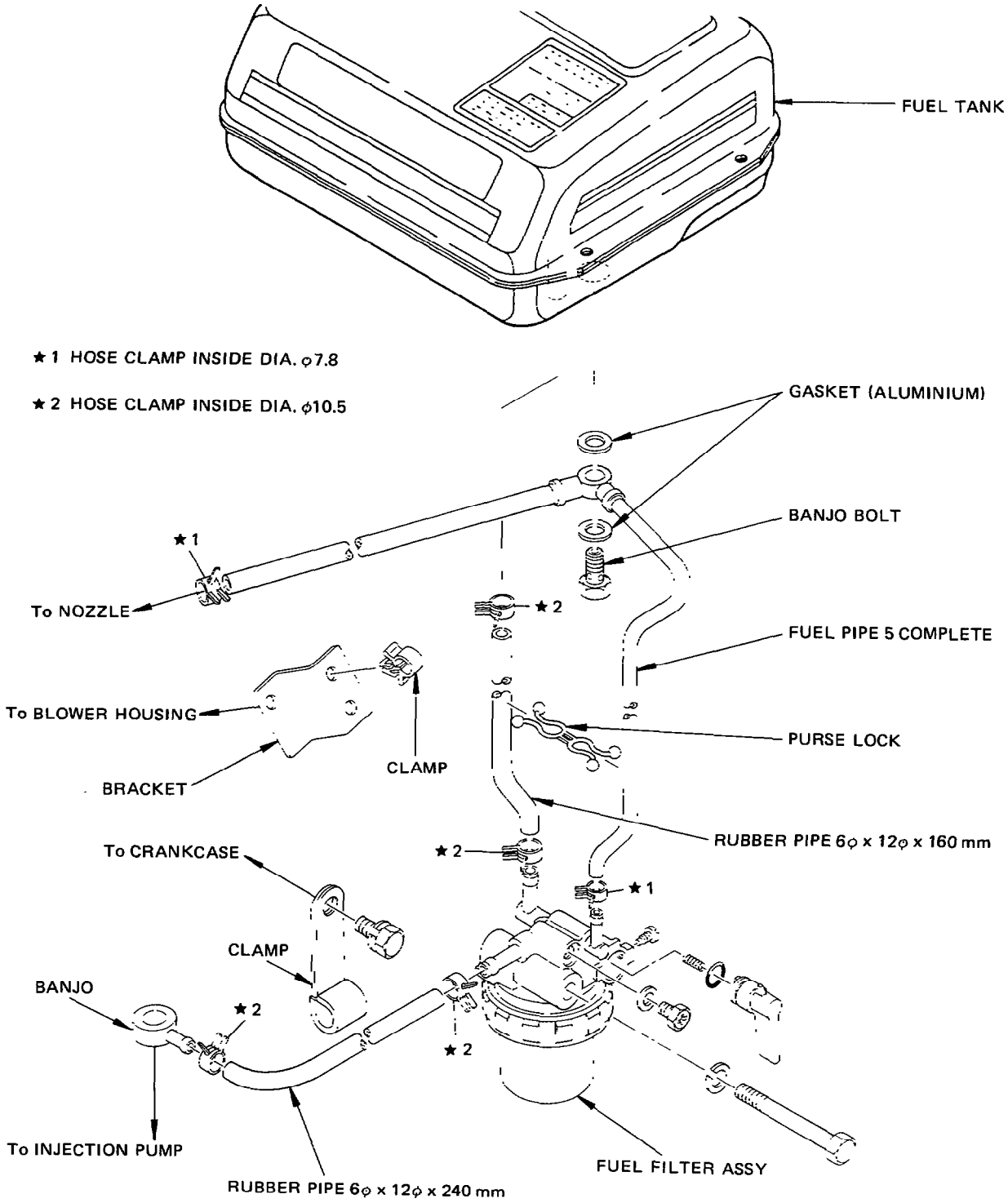


Fig. 10-42

2) Install the fuel tank on the side plates with rubber washers between them.

8ϕ x 15 mm bolt	4 pcs.
8ϕ spring washer	4 pcs.
8ϕ washer	4 pcs.
Or 8ϕ x 15 mm bolt and washer assembly	4 sets

3) Connect the fuel pipe.

a. Install the fuel filter assembly on the boss on the side of the adaptor (generator).

8ϕ x 65 mm bolt	1 pce.

b. Connect the other end of the pipe installed in Step 1) to the fuel filter.

Slide the hose clamp over the pipe, connect the pipe to the fuel filter, and clamp the pipe at the correct point. Then, secure the pipe with the purse lock.

NOTE: Connect the shorter pipe of fuel pipe 5 complete to the fuel filter. The hose clamp for the rubber pipe has an inside diameter of 10.5 mm, and that for fuel pipe 5 complete is 7.8 mm in inside diameter.

c. Connect the longer pipe of fuel pipe 5 complete to the engine nozzle.

The nozzle must be pulled up from the cylinder head before connecting the pipe to it.

After pulling the nozzle up, slide the hose clamp (7.8 mm in inside diameter) over the pipe, connect the pipe to the nozzle, and fasten the pipe with the hose clamp at the correct point.

Then, install the nozzle on the head.

Mount the bracket on the blower housing, and secure the pipe with the clamp.

d. Connect the fuel filter and injection pump with pipe.

Fit the banjo to the rubber pipe (6 mm in inside diameter, 12 mm in outside diameter, 240 mm long) and clamp it. Connect the other end of the pipe to the fuel filter and clamp it. Connect the banjo to the injection pump. A gasket must be placed on each side of the banjo. Use hose clamps 10.5 mm in inside diameter. Finally, clamp the pipe to the crankcase.

4) Fasten the handle bracket to the crankcase.

10-4 CONTROL BOX CHECK, DISASSEMBLY and REASSEMBLY

10-4-1 CHECK

Check the wiring after removing the control box from the pipe frame and box panel B from the back of the control box.

10-4-2 DISASSEMBLY

1) Remove box panel B from the back of the control box. (See Fig. 10-43.)
2) Disconnect the connector and automatic voltage regulator (AVR) from box panel B.

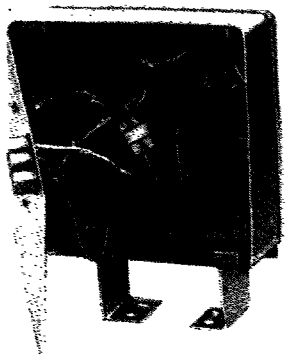
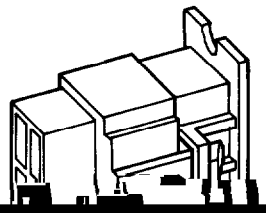
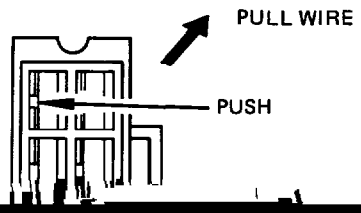
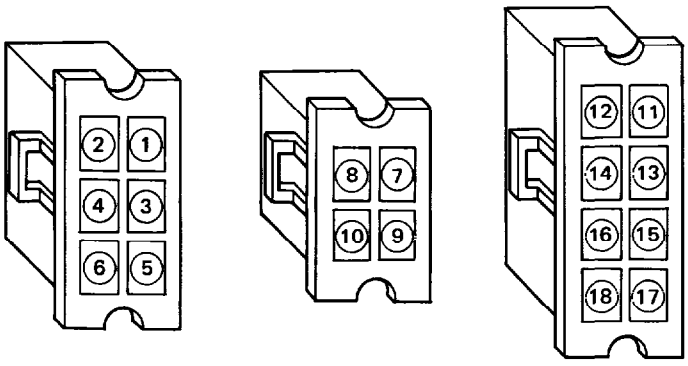


Fig. 10-43

3) Disconnect the AVR wires. Pull out the 4P connector by pushing the lock as shown in Fig. 10-44.
Disconnect the primary exciting wires (two yellow ones) by pushing the terminal catches inside the connector with something pointed like a needle until the terminals come off. (See Figs. 10-44 and 10-45.)







NOTE: White wire ⑱ has not been used since March 1983, when it was replaced by body grounding.

SPEC.		①	②	③	④	⑤	⑥	⑦	⑧	⑨
Hand	220, 230, 240V	YELLOW	YELLOW	BROWN	GREEN	BROWN / WHITE	ORANGE	WHITE	RED	—
Start	D type, 110, 120V	YELLOW	YELLOW	BROWN	GREEN	BROWN / WHITE	ORANGE	WHITE	RED	YELLOW
Electric	220, 230, 240V	—	—	BROWN	GREEN	BROWN / WHITE	ORANGE	WHITE	RED	—
START	D type, 110, 120V	—	—	BROWN	GREEN	BROWN / WHITE	ORANGE	WHITE	RED	—

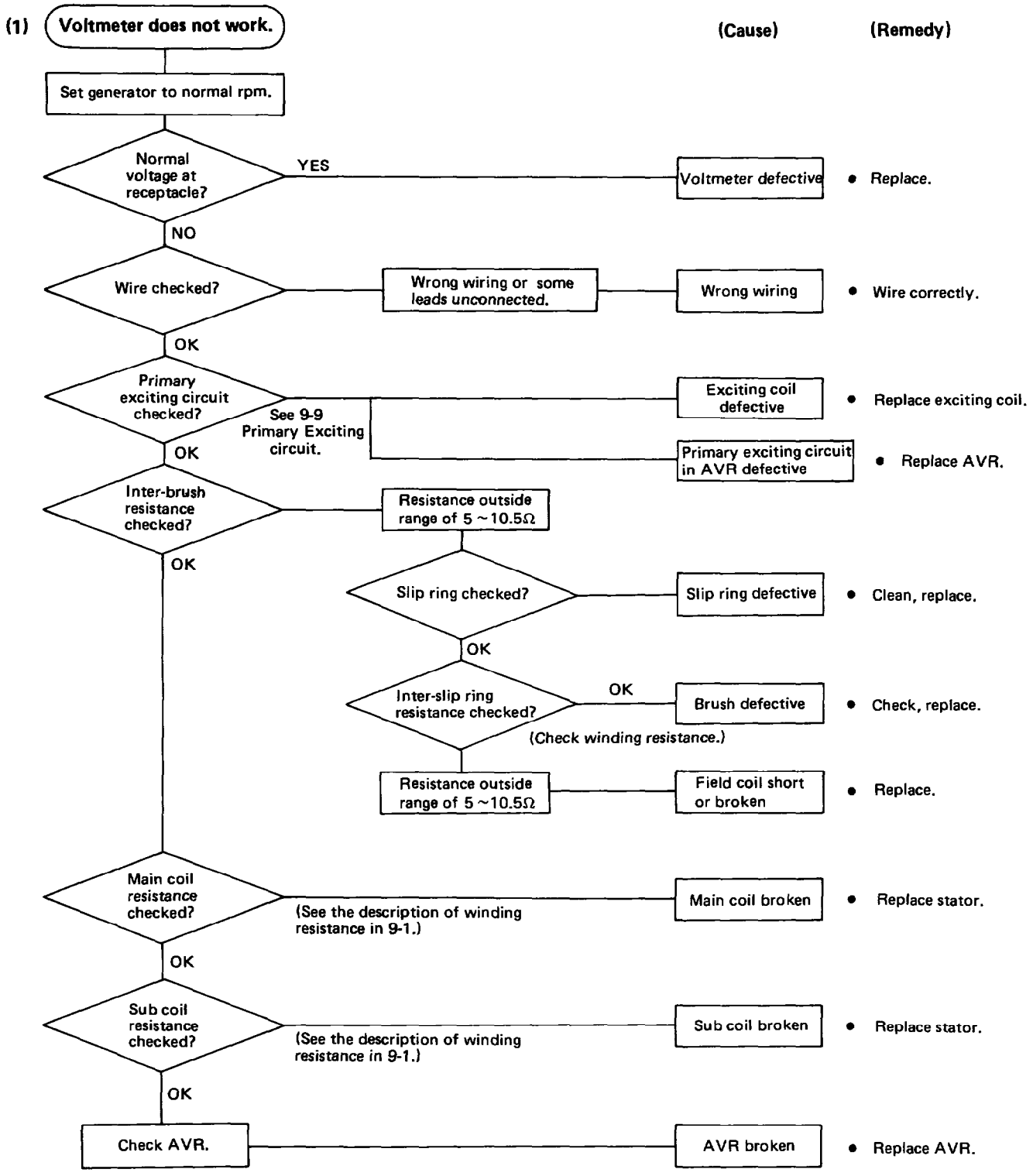
SPEC.		⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱
Hand	220, 230, 240V	—	—	—	—	—	—	—	—	—
Start	D type, 110, 120V	BLACK	—	—	—	—	—	—	—	—
Electric	220, 230, 240V	—	YELLOW	YEELOW	—	—	PINK	GREY	—	(WHITE)
Start	D type, 110, 120V	—	YELLOW	YELLOW	—	—	PINK	GREY	—	(WHITE)

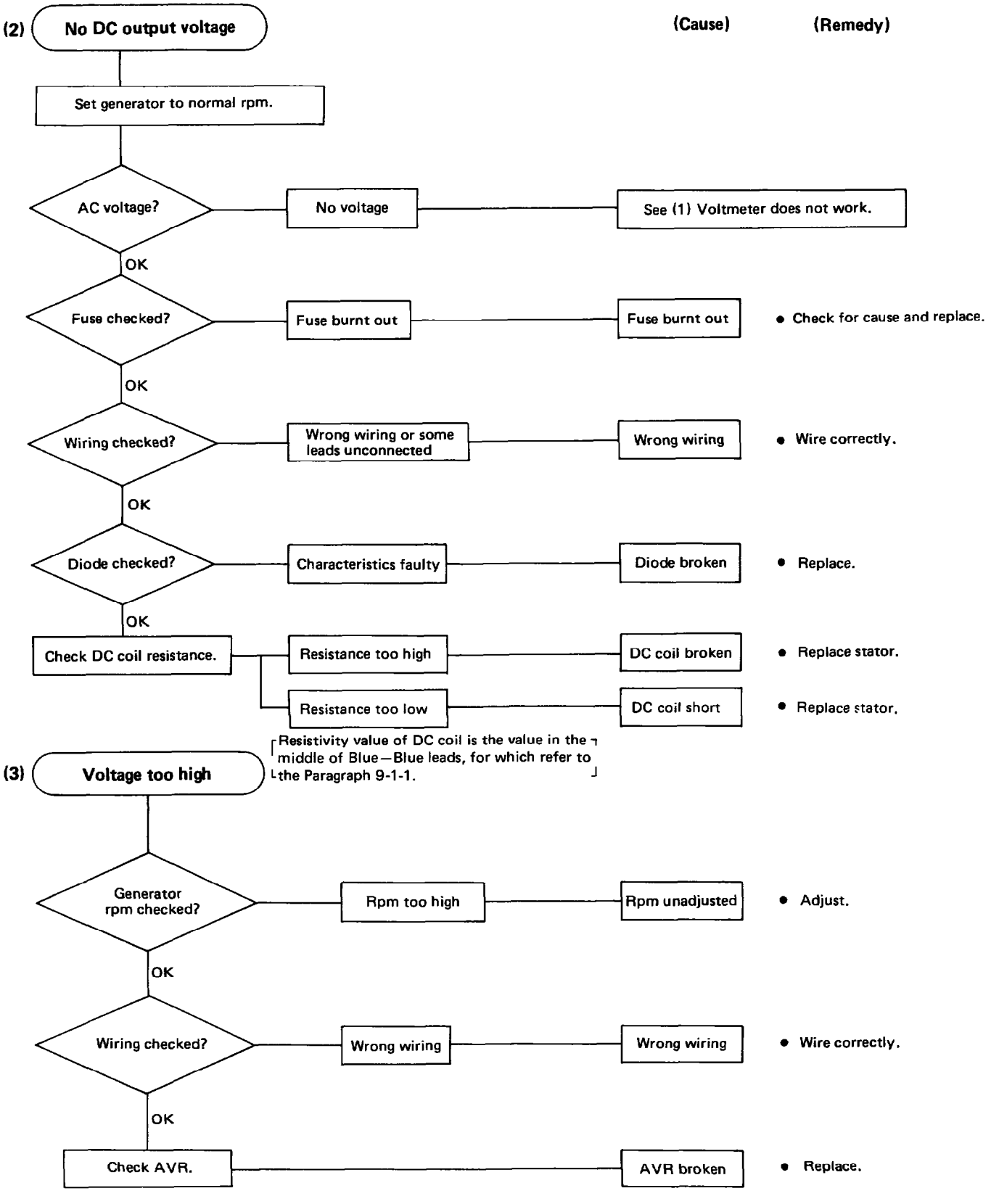
Table 10-4

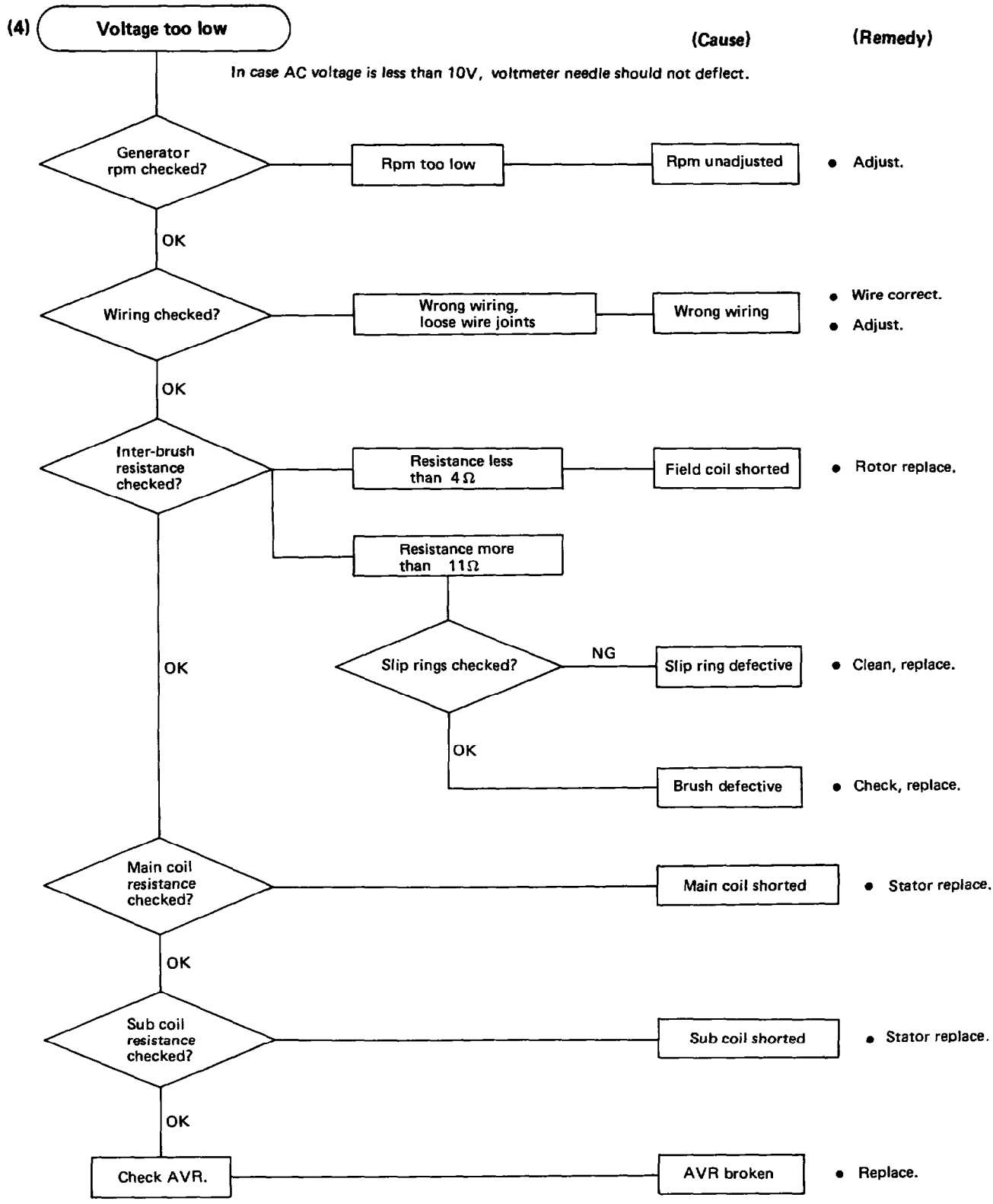
4) Install the connector which was wired to control panel B in Step 3) b.
   If your Robin generator has an electric starter, install the diode and wire it.
   Install the exciter coil wire clamp on the side opposite to control panel B.
5) Install control panel B on the control box.
   4ϕ x 10 mm screw . . . . . 6 pcs.

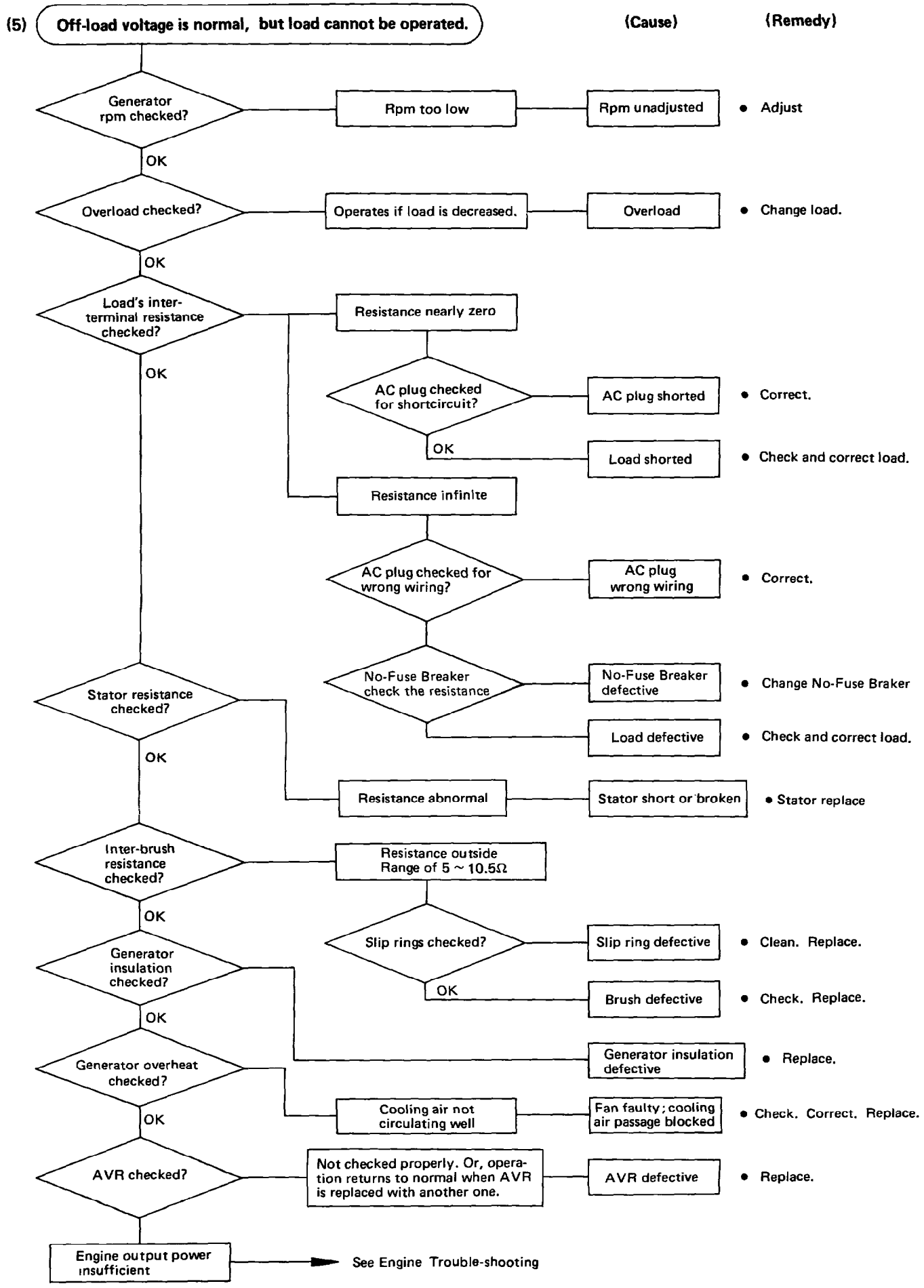
11. TROUBLE-SHOOTING

When the generator is in trouble, check carefully the trouble part and remedy it.




(2) No DC output voltage
(Cause)
(Remedy)
Set generator to normal rpm.
AC voltage?
No voltage
See (1) Voltmeter does not work.
OK
Fuse checked?
Fuse burnt out
Fuse burnt out
• Check for cause and replace.
OK
Wiring checked?
Wrong wiring or some leads unconnected
Wrong wiring
• Wire correctly.
OK
Diode checked?
Characteristics faulty
Diode broken
• Replace.
OK
Check DC coil resistance.
Resistance too high
DC coil broken
• Replace stator.
Resistance too low
DC coil short
• Replace stator.
Resistivity value of DC coil is the value in the middle of Blue—Blue leads, for which refer to the Paragraph 9-1-1.
(3) Voltage too high
Generator rpm checked?
Rpm too high
Rpm unadjusted
• Adjust.
OK
Wiring checked?
Wrong wiring
Wrong wiring
• Wire correctly.
OK
Check AVR.
AVR broken
• Replace.


(4) Voltage too low
(Cause)
(Remedy)
In case AC voltage is less than 10V, voltmeter needle should not deflect.
Generator rpm checked?
Rpm too low
Rpm unadjusted
• Adjust.
OK
Wiring checked?
Wrong wiring, loose wire joints
Wrong wiring
• Wire correct.
• Adjust.
OK
Inter-brush resistance checked?
Resistance less than 4Ω
Field coil shorted
• Rotor replace.
Resistance more than 11Ω
Slip rings checked?
NG
Slip ring defective
• Clean, replace.
OK
Brush defective
• Check, replace.
OK
Main coil resistance checked?
Main coil shorted
• Stator replace.
OK
Sub coil resistance checked?
Sub coil shorted
• Stator replace.
OK
Check AVR.
AVR broken
• Replace.


(5) Off-load voltage is normal, but load cannot be operated.
(Cause)
(Remedy)
Generator rpm checked?
Rpm too low
Rpm unadjusted
• Adjust
OK
Overload checked?
Operates if load is decreased.
Overload
• Change load.
OK
Load's inter-terminal resistance checked?
Resistance nearly zero
AC plug checked for shortcircuit?
AC plug shorted
• Correct.
OK
Load shorted
• Check and correct load.
OK
Resistance infinite
AC plug checked for wrong wiring?
AC plug wrong wiring
• Correct.
No-Fuse Breaker check the resistance
No-Fuse Breaker defective
• Change No-Fuse Braker
Load defective
• Check and correct load.
Stator resistance checked?
OK
Resistance abnormal
Stator short or broken
• Stator replace
Inter-brush resistance checked?
Resistance outside Range of 5 ~ 10.5Ω
OK
Slip rings checked?
Slip ring defective
• Clean. Replace.
Generator insulation checked?
OK
Brush defective
• Check. Replace.
OK
Generator insulation defective
• Replace.
Generator overheat checked?
OK
Cooling air not circulating well
Fan faulty; cooling air passage blocked
• Check. Correct. Replace.
AVR checked?
Not checked properly. Or, operation returns to normal when AVR is replaced with another one.
AVR defective
• Replace.
Engine output power insufficient
See Engine Trouble-shooting

12. OPTIONS

An electric starter, castors, etc. are available as options for the RGD Series. The procedures for adding options, changing parts, disassembly and reassembly are described below.

12-1 ELECTRIC STARTER

Robin generators with an electric starter are maker options because the crankcase must be specially modified to suit it.
The engine parts to be changed to meet the electric starter specifications include the crankcase, ring gear, and starter motor.
For these main engine parts, refer to the SERVICE MANUAL for the Robin Diesel Engines DY30D and DY35D.
The parts peculiar to the RGD351 and the generator parts are explained below.

12-1-1 FRAME

The frame has a battery base for installing the battery, and is partially changed to fasten it. (See Figs. 12-1 and 12-2.)

■RGD351, RGD351D

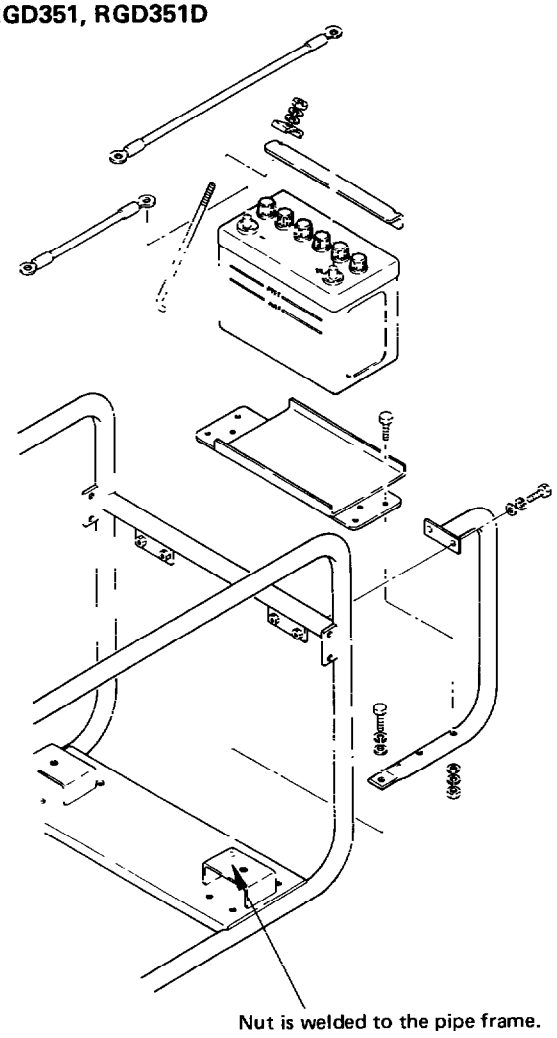


Fig. 12-1

■RGD500, RGD500D

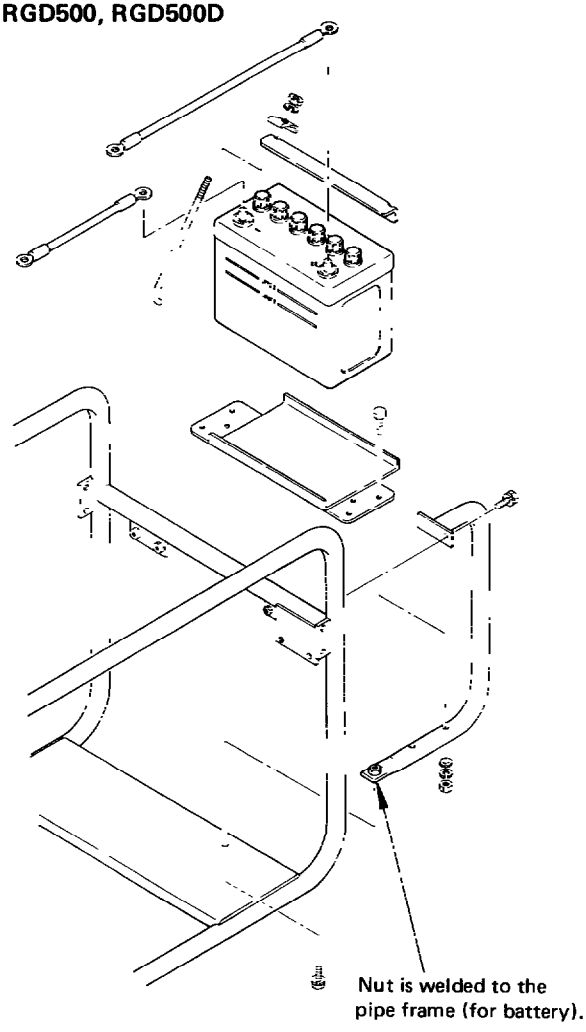


Fig. 12-2

12-1-2 CONTROL BOX

The control box is additionally fitted with a key switch and diode stack.

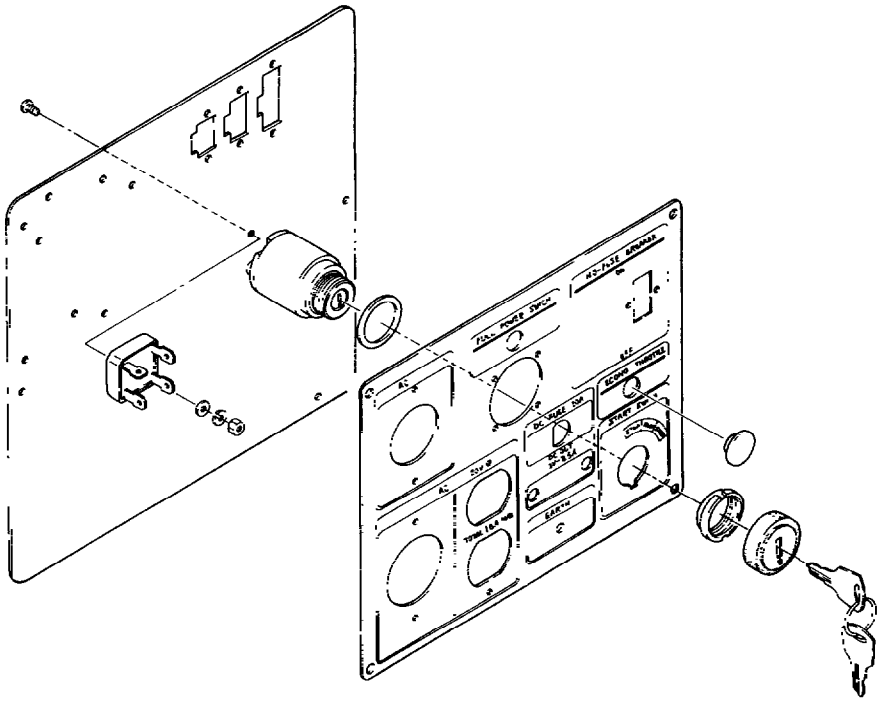


Fig. 12-3

12-2 CASTORS

All the RGD351 and RGD351D models have holes drilled in their frame for installing castors in place of rubber mounts on the underside of the frame. It is also necessary to change the rubber mounts because vibration varies due to the castors. Therefore, the castors are maker options. Models RGD500 and RGD500D are all originally furnished with casters.

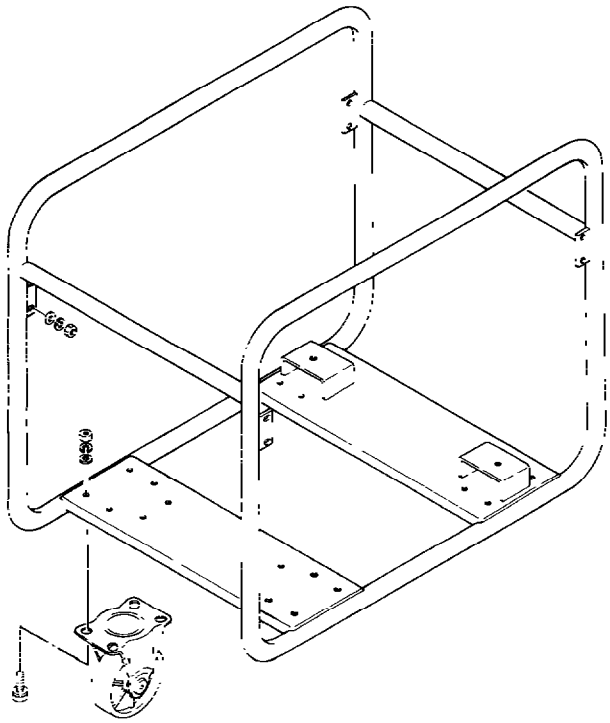
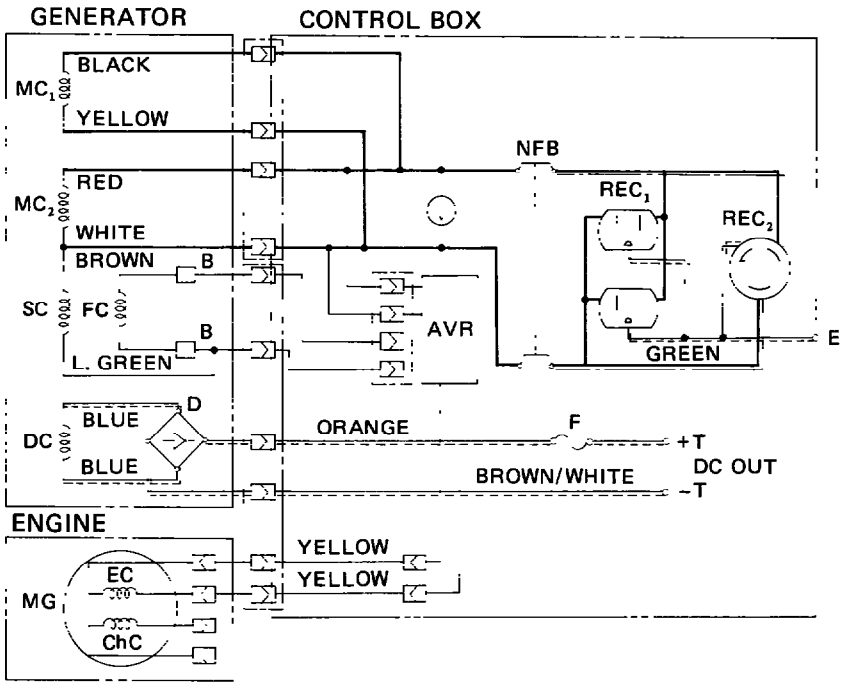


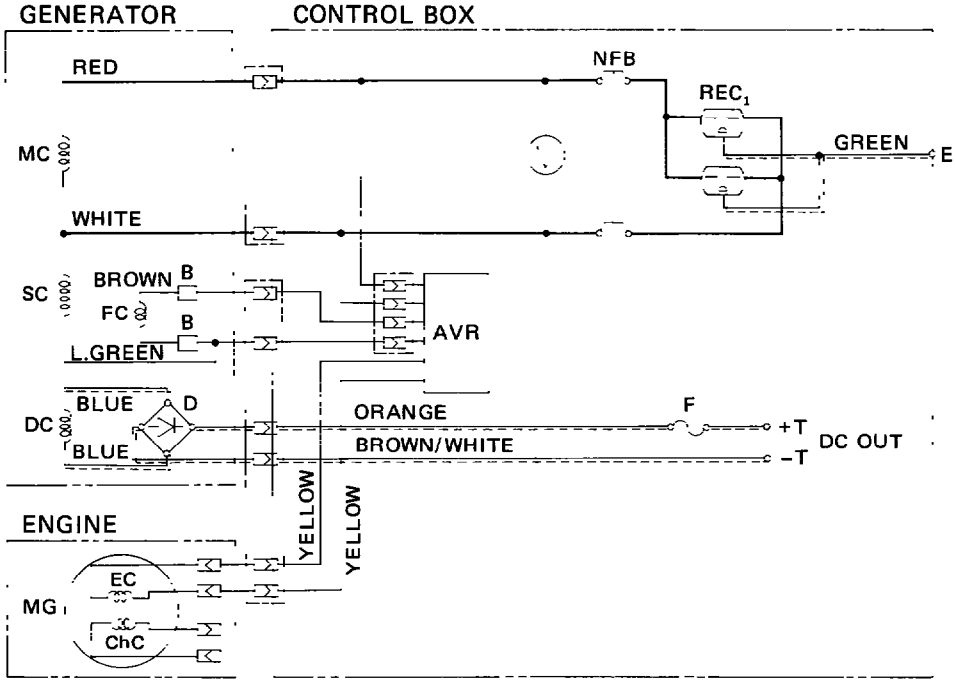
Fig. 12-4

13. CIRCUIT DIAGRAM

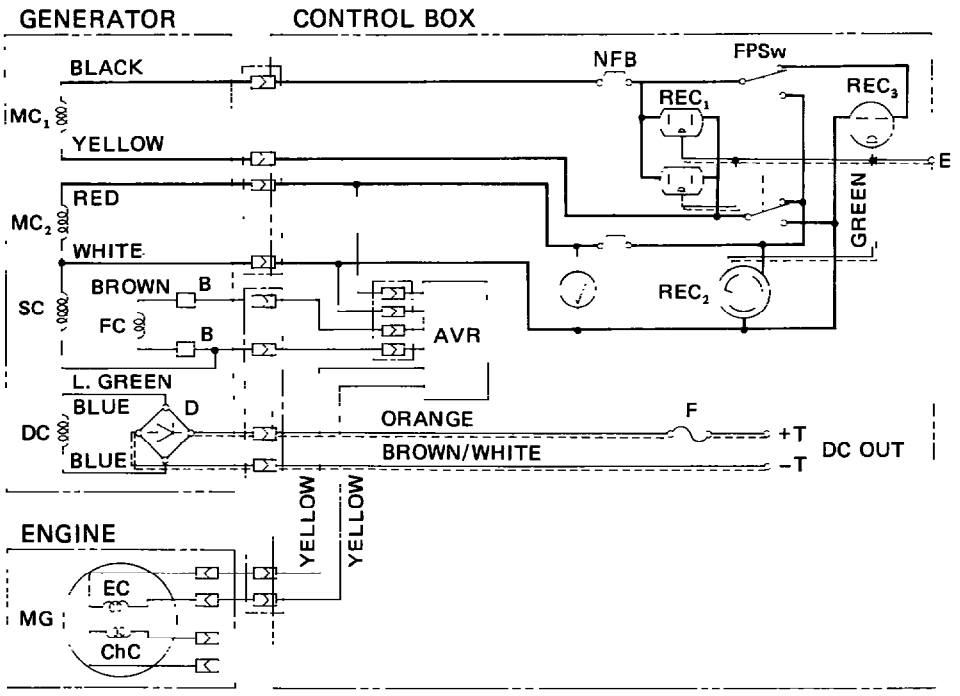
RGD351 (110V, 120V)



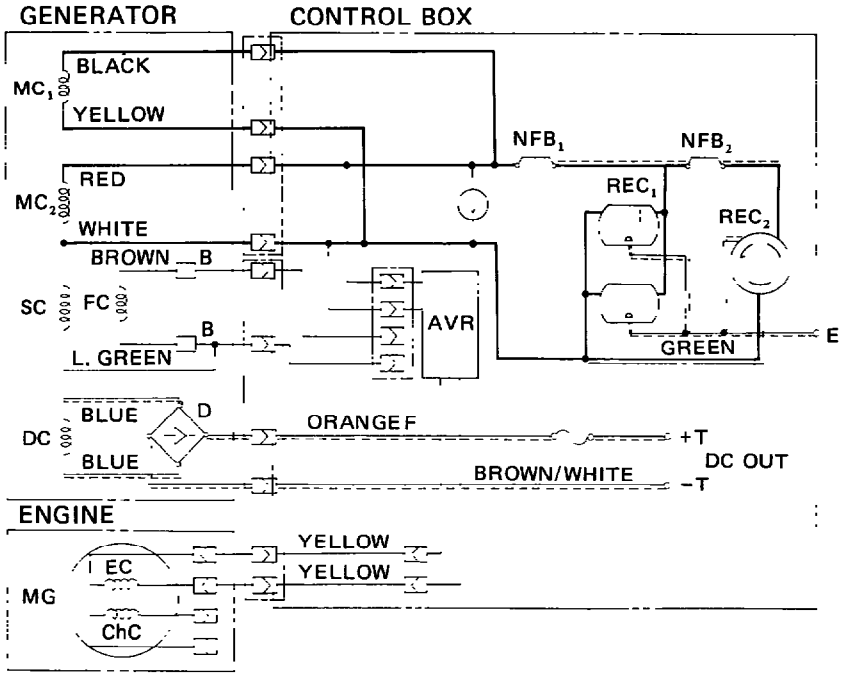
RGD351 (220V, 230V, 240V)



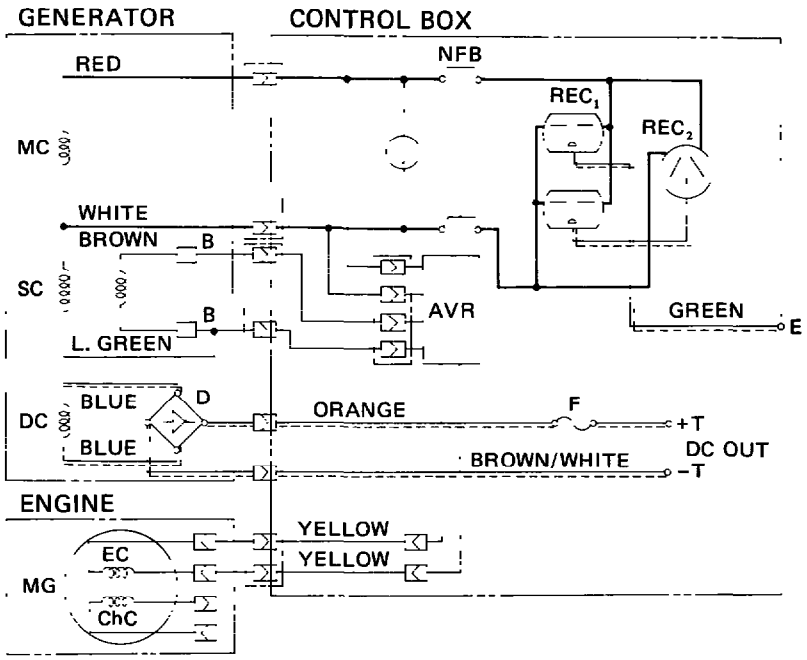
RGD351D (110/220V, 120/240V)



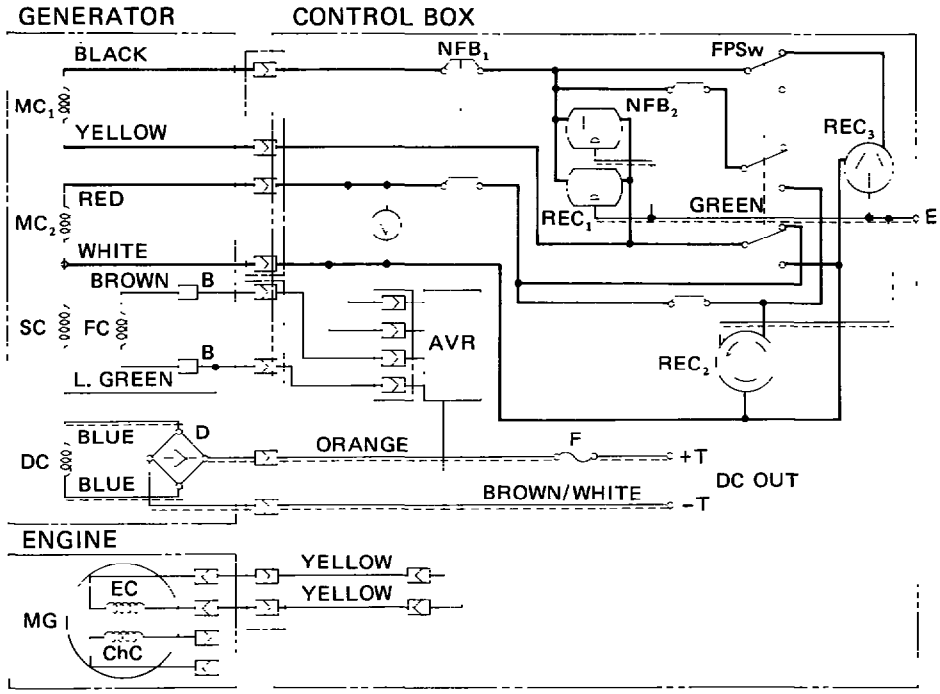
RGD500 (110V, 120V)



RGD500 (220V, 230V, 240V)



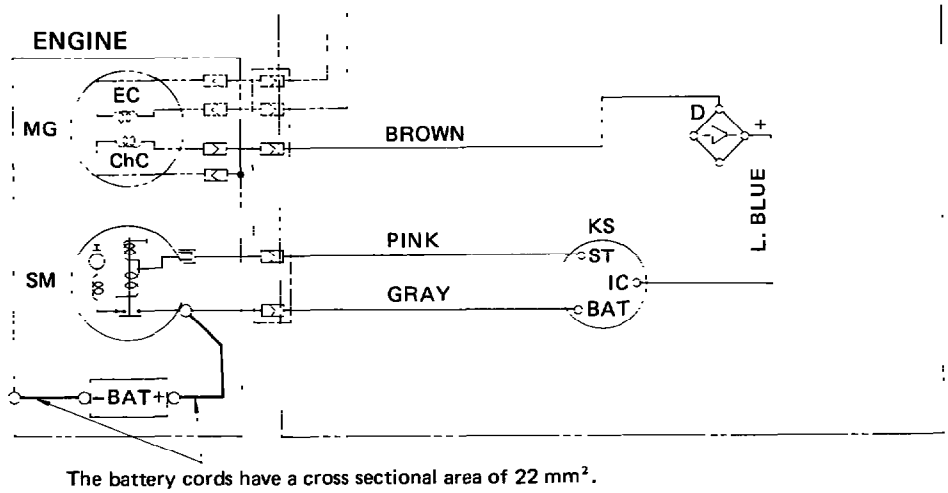
RGD500 (110/220V, 120/240V)



REC_3 for the U.S.A. and Canada is of the shape (U)

FOR ELECTRIC START TYPE

CONTROL BOX



The battery cords have a cross sectional area of 22 mm^2.

•SYMBOLS

Symbols	Name of Parts
MC	AC Winding
SC	Auxiliary Winding
DC	DC Winding
FC	Field Winding
B	Brush
AVR	Auto Voltage Regulator
V	Voltage Meter
FPSw	Full Power Switch
D	Diode Stack Assy
F	Fuse
REC_1	AC Output Receptacle (Total 15A Max)
REC_2	AC Output Receptacle (110/120V)
REC_3	AC Output Receptacle (220/230/240V)

Symbols	Name of Parts
T	DC Output Terminal
NFB	No-Fuse Breaker
E	Earth Terminal (Ground)
MG	Magneto
EC	Exciting Coil
ChC	Charge Coil
SM	Starting Motor
BAT	Battery
KS	Key Switch

The wire symbols in the circuit diagrams signify as follows. Use the wire sizes specified.

- 0.75 mm^2
- 1.25 mm^2
- 2.0 mm^2
- 3.5 mm^2
- 5.0 mm^2

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